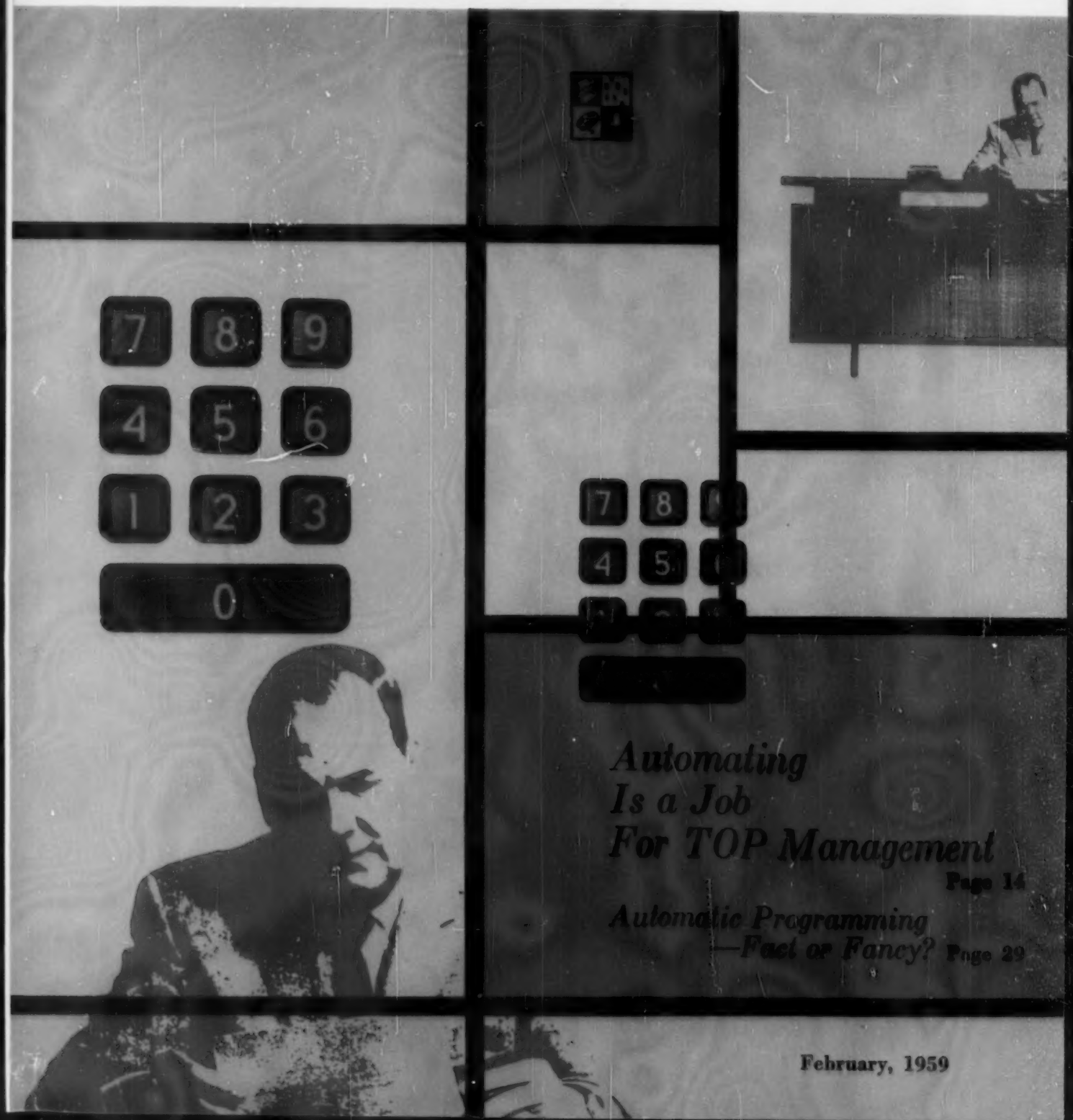
MANAGEMENT *and* BUSINESS AUTOMATION



Automating Is a Job For TOP Management

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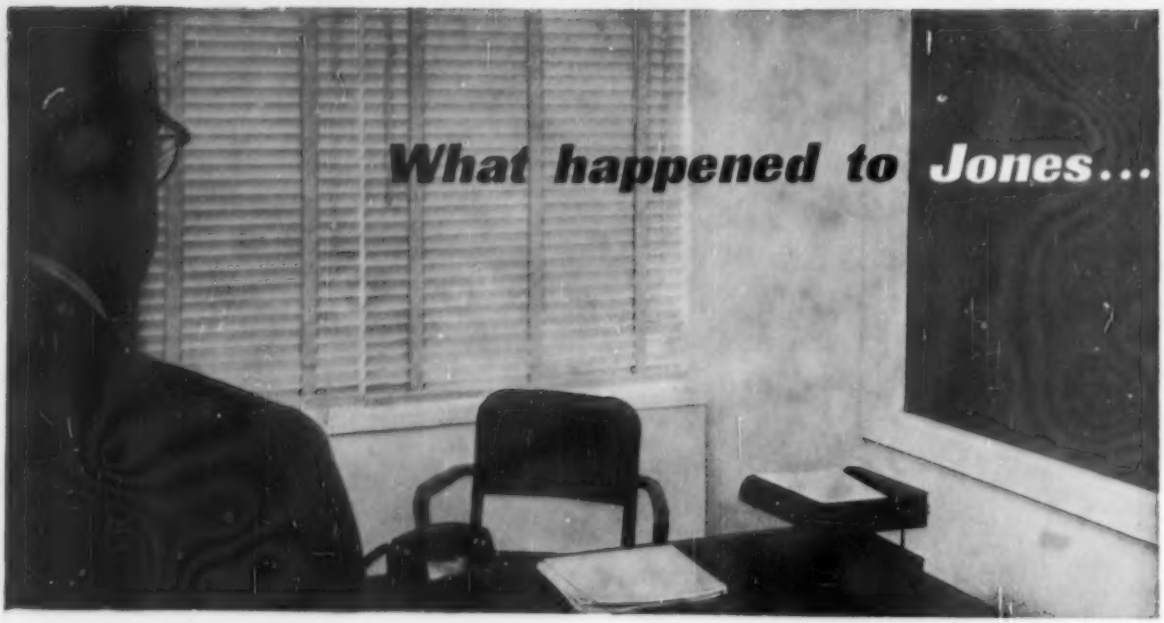


...could happen to any man

Jones suffered a heart attack. It happens to hundreds of thousands of Americans each year. Heart attack, or coronary artery disease, is our nation's leading single cause of death, accounting for 250,000 fatalities annually.

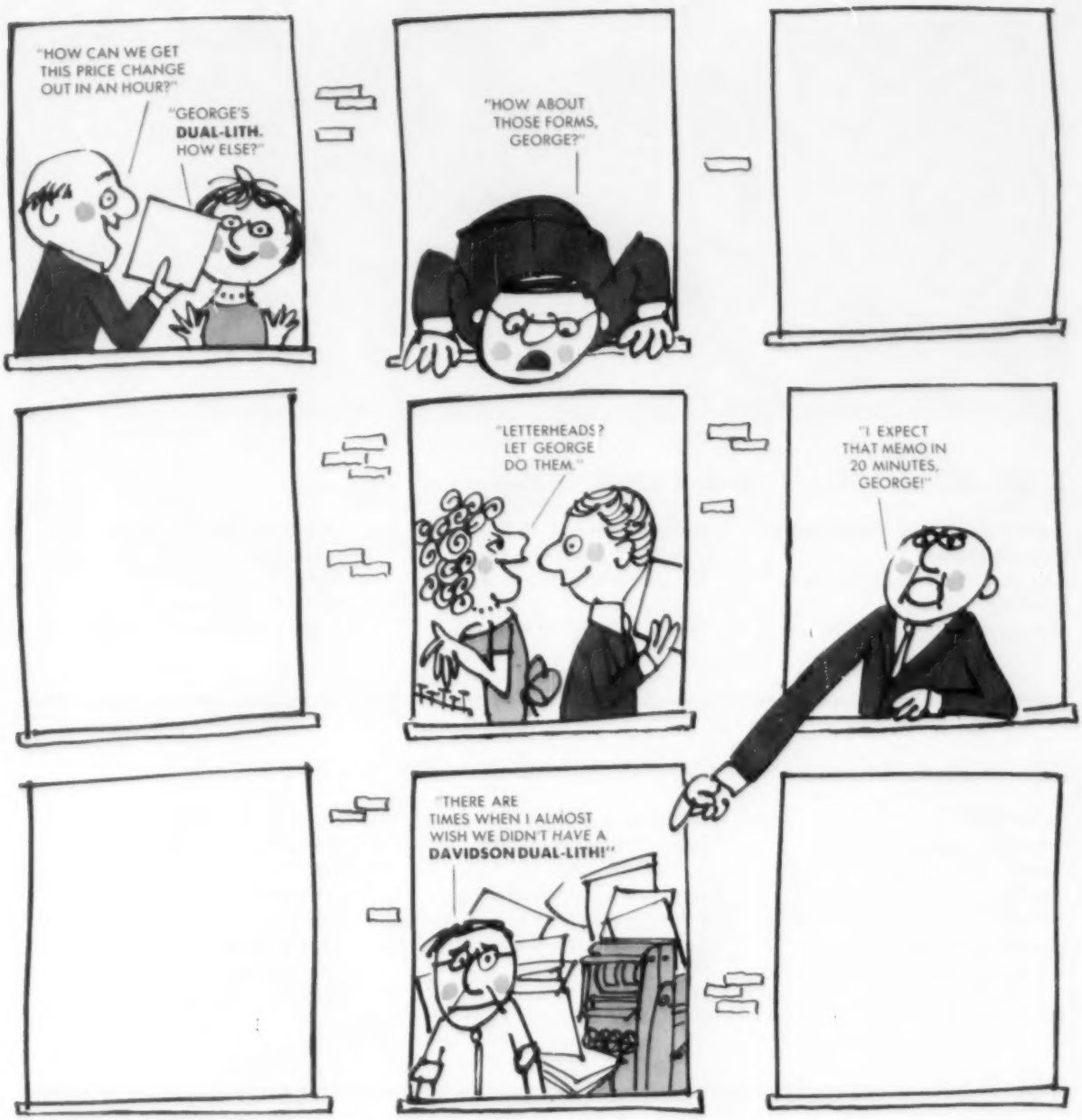
But because of new advances in diagnosis and treatment, *most victims of heart attack recover* to lead useful and productive lives.

Jones recovered and is back at his desk today, thanks to new medical knowledge developed through heart research.

Your Heart Association, through *your* support of the Heart Fund, has allocated more than $32 million during the past ten years to research on heart and circulatory diseases. A large portion is being spent to discover the underlying causes of atherosclerosis, a form of hardening of the arteries, which is responsible for heart attack.

When you give to the Heart Fund, you are joining forces with medical science to carry forward intensive research on all forms of heart and blood vessel disease. Thus, you are making the best investment you can to safeguard *your* heart and the heart of *each member of your family.*

FIGHT HEART DISEASE ® **GIVE HEART FUND**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"GEORGE'S DUAL-LITH. HOW ELSE?"
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"LETTERHEADS? LET GEORGE DO THEM."
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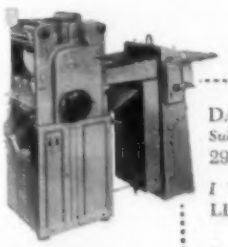
Call your distributor (he's listed in the Yellow Pages) – or send the coupon to us today – for free descriptive folders about the many DUAL-LITH models! Davidson Corporation, 29 Ryerson Street, Brooklyn 5, New York. Subsidiary of Mergenthaler Linotype Company.



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Feature subjects scheduled for 1959 issues

BUSINESS AUTOMATION IN GENERAL . . .

- Social Aspects and Consequences
- Union Attitudes
- Regrooming the Executive Staff
- Investment Factors
- Training New Operating Personnel
- Executive Control of Business Forms
- The Executive's Role in Business Automation
- Proper Housing of Equipment
- Implications of Operations Research
- Programming Problems
- Electronic Communications
- Business Automation Overseas

SPECIFIC BUSINESS OPERATIONS TO BE COVERED . . .

- Order Writing
- Payroll Accounting
- General Accounting
- Auditing
- Budgeting
- Invoicing and Billing
- Accounts Receivable
- Accounts Payable
- Cost Accounting
- Statistical Reporting
- Forms Design and Control
- Business Forecasting
- Personnel Record-keeping
- Addressing and Mailing
- Copying and Duplicating
- Filing
- Microfilming
- Inter-office Communicating
- Inter-city Communicating
- Engineering Computing
- Data Reduction
- Production Planning
- Inventory Control
- Material Control
- Sales Analysis
- Operations Research

ADDITIONAL SPECIALIZED OPERATIONS . . .

- Utility Billing
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- Actuarial Computing
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It is no longer necessary to search through many different magazines to be fully informed on business automation. MANAGEMENT and BUSINESS AUTOMATION'S editorial staff is dedicated to the task of reporting every significant development.

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MANAGEMENT *and* BUSINESS AUTOMATION

February, 1959
Vol. 1, No. 2

Reporting to management on new ideas, developments, applications, results, and the human impact of office automation in all areas of commerce, industry and government.

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By Gen. Clinton F. Robinson

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NEWS

See Record Growth at Stromberg-Carlson

Sales of the Stromberg-Carlson Division of General Dynamics Corporation showed moderate gains during 1958 and should show record growth during 1959, according to Robert C. Tait, division president. Substantial orders have been received for telecommunication and electronic equipment from both industry and government, Mr. Tait said. He pointed out that new products developed during the past year should lead to an even greater volume.

Chief among these developments was the S-C 5000 high-speed electronic printer. The U. S. Army Engineer District, Washington, placed the first of these 5,000-line-per-minute printers into operation during the summer and plans to install two more this year. New auxiliary equipment, including the forms registration buffer designed for use with the S-C 5000, was also developed during the year.

Stromberg-Carlson moved forward in the field of telecommunication. The Northern Illinois Toll Road installed S-C multiplex equipment as an integral part of its communication system. "Pagemaster" selective radio paging systems continued to receive wide acceptance by industry and hospitals. A complete communication system using a transistorized power supply, culminating more than two years of development and testing, was installed by the Rochester Transit Corp., first urban tran. it system in this country to equip its entire fleet with two-way radios.

During the year the company was permitted to display for the first time the push-button field telephone which is part of the revolutionary electronic telephone switching system being developed for the U. S. Army Signal Corps. Incorporated within the telephone case are all the necessary signalling equipment, amplifiers and even battery power supply that would be needed for a telephone circuit operating over thousands of miles and going through as many as 12 switching centers. The system is completely transistorized.

A major expansion program got under way in December at the company's San Diego Electronic Systems plant. Work was started on the construction of a 15,750 square foot building. This 43 per cent increase in the plant will bring the total San Diego facility to 71,000 square feet.

UCLA Gets Check Processor for Study

A prototype automatic check processor, designed as a data processing system for banks, has been turned over to UCLA as an experimentation and training tool for faculty and engineering students.

The machine comprises a tape-affixing machine, a central electronic computer, a printer and an electromechanical sorter. In the machine, a punched tape, containing all necessary information for routing the check through bank channels, is attached to each check. The checks are then sorted and items are computed and reconciled, all automatically.

Telemeter Magnetics, Inc., a subsidiary of Paramount Pictures Corp., has developed this Telemeter Check Processing Machine, the only model of its kind.

Forrest New V-P At Control Data Corp.

Henry S. Forrest has been named to the post of vice-president of Control Data Corp., Minneapolis computer and instrument firm.

He has held the position of director of government service engineering and manager of the company's eastern office in Washington, D.C. since he joined Control Data in 1957.

Henry S. Forrest

His step up, according to William C. Norris, president, is the first of a number of moves on the part of the company to expand activities with the government and with principal prime contractors to the government on major millile and military system efforts.

Forrest maintains his headquarters in the Capitol and is directing all estern operations.

Webster Electric Acquires Telecom, Inc.

First move of the Webster Electric Co. in its 50th anniversary year was the acquisition of Telecom, Inc., Kansas City, Mo., in a move to expand its intercommunications line.

According to David J. Munroe, Webster's president and chief executive officer, the addition of this new line is compatible with his firm's Teletalk intercom equipment. Telecom's system operates through an automatic telephone-type switchboard, and the Teletalk system is directly connected from speaker to receiver.

John Van Horn, former Telecom president, will remain with the company as resident manager in charge of the firm in Kansas City. Telecom will operate as a wholly-owned subsidiary of Webster and will continue production in Kansas City for the time being.

Now! World's Smallest Recorder (1¾ lb.) Records up to 4 Hours on one spool... then Minifon Plays Back Immediately!

"BATTERY OPERATED MINIFON DOES BEST JOB" Says Leading Executive!

"I've tried other types of recorders and have discarded them all since I learned about MINIFON." Nothing can match the convenience and light weight of this remarkable pocket-size, highly faithful recording instrument." Today major industrial concerns insist that their executives carry Minifon recorders on all business trips, because Minifon is the only foolproof way to record on-the-spot information from contacts in the field. Minifon hears everything said and forgets nothing—eliminates the time, labor and errors-of-memory that go into written reports. And a Minifon with automatic push button controls will take dictation anytime, anywhere, under any conditions—you can even "talk to it" while driving a car or flying a plane!

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The actual use of a featherweight Minifon recorder is too simple to need much explaining. You just stick it in a pocket and use the tiny mike under your lapel (or wear the facsimile wrist-watch mike or tie-clip mike!), and when you want to record your words—or the words of anyone within about twenty feet—you simply put your hand in your pocket and press a silent switch. You can record up to 4 hours of talk on a single "record" (wire reel), and the "records" are so small and light they can be mailed.

Write now for Details and new LOW PRICE

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For More Information Circle Reader Service Card No. 2-54

No. 2500 for SPA

Pretty Marilyn Joan Kennelly, supervisor of methods publications in the Methods and Organization Planning department of Burroughs Corp.'s Research Center, has been accepted as the 2,500th member of the Systems and Procedures Association.

Miss Kennelly's membership points to a double milestone in the Association's history. First, she is

Miss Kennelly and MacQueen

the 2,500th member in the fast growing organization of systems administrators, a relatively new profession; and second, she is proof that women can be as much at home in the complex field as men.

She is a member of the Delaware Valley Chapter in Philadelphia, one of SPA's newest groups. Before joining Burroughs, she was associated with the City of Philadelphia, the Cunard Steam Ship Co., and was a member of the faculty of the Peirce School of Business Administration and the Philadelphia School System.

She received her membership certificate from Joseph A. MacQueen, president of the SPA.

Clary Chief Predicts Business Increase

A "better over-all business climate" in 1959 is the prediction made by Hugh L. Clary, president of Clary Corp., manufacturers of business machines, electronic equipment and missile components.

The prediction is based on the expanded market being created by the population growth as well as the fact that Clary, in the teeth of the recession, added more than $2 million in sales in 1958.

Computer to Assist in Army Officer Training

The U. S. Army will soon have a computer system that will be used to provide senior officers with practical training in simulated combat situations.

It will be in operation at the U. S. Continental Army Command in Fort Monroe, Va. The computer will be of modular solid state design and will be transportable by truck because training exercises will be held in varied geographical locations.

Simulated problems that officers will face include movement and disposition of troops, effects of firepower, and results of reconnaissance and intelligence activities. They will determine actions to be taken and issue the necessary orders, repeating the cycle until the ultimate objectives are achieved.

The use of a high speed computer system is expected to increase the effectiveness of Command Post Exercises while reducing the numbers of Army personnel required for routine computation and record keeping presently associated with this type of training. The system is manufactured by International Business Machines Corp.

Kodak Announces New Microfilm Policy

As of January 1, the Recordak Corp. has taken over complete distribution of all microfilm products produced by Eastman Kodak, and plans to distribute these products and services through Microdealers, Inc., an independent group of microfilm service companies.

This new policy means that all Recordak microfilm equipment, film and services, such as processing, exerographic prints, and other services, will be offered by this group.

Stromberg-Carlson Expands Facilities

A new three story building with 15,750 square feet of space will be added to the facilities of Stromberg-Carlson in San Diego, according to Harold P. Field, general manager.

Field said the new building will be used for continued expansion of engineering and manufacturing activities in computer readout and display equipment. Construction next to the Electronic Systems Plant at 1895 Hancock St. began in mid-December and is expected to be completed in March.

Introduce In-Circuit Transistor Tester

The first transistor tester capable of checking the performance of transistors while they are connected within their circuits is now being produced by the Philco Corp. The units are going to the U.S. Navy's Bureau of Ships, but Philco has announced that a commercial model will be available soon.

'Baby Sitters' Used At Launching Sites

Electronic "baby sitters" are used at Sycamore Canyon in Southern California to bring scientists close up views of the last stages of rocket firing and testing. The baby sitters are closed circuit television installations. They got their name from from the man who supplies many of them for their special jobs.—H. L. Silberman, president of the Kin Tel Division of Cohu Electronics, Inc.—and they are used on all of Uncle Sam's missile launching pads and test stands.

Thirty minutes before the completion of the countdown on each static test-firing, the missile scientists, engineers and technicians leave the test stand and retire to a well-shielded blockhouse some 400 feet away.

A flip of a switch is the electronic command for the baby sitters to take over, and four carefully-placed television cameras, each completely ruggedized in special housing, turn their electronic eyes on the missile. They watch every phase of the automatic "feeding" of a missile and the static firing of the rocket engines

On monitor screens, in the safety of the blockhouse, the scientists see everything as well as if they were standing within three feet of the actual firing.

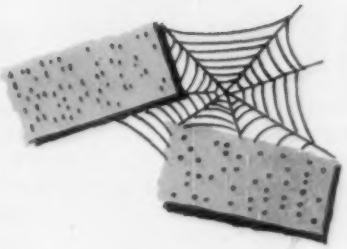
On a remote control panel in the blockhouse, technicians can direct the pan and tilt of the cameras, and make all the adjustments that would be possible if the cameras were being operated manually.

Curtis Gets Electronic Labeling System

An electronic printer capable of printing more than a million address labels during an eight-hour day will soon be in use at the Curtis Publishing Co., in Philadelphia. The new system is said to print labels up to 10 times faster than existing electro-mechanical printers.

Manufactured by Stromberg-Carlson, the equipment consists of an S-C 5500 high speed electronic label printer combined with an M-60 auxiliary editing buffer. The S-C 5500 uses a Charactron shaped beam tube and a Xerox Copyflo printer; it electronically registers address information and perforates continuous rolls of paper to label size so that addresses are prepared for Cheshire mailing equipment. The M-60 buffer will handle up to four magnetic tape inputs, while the S-C 5500 will print simultaneously on four separate rolls of paper.

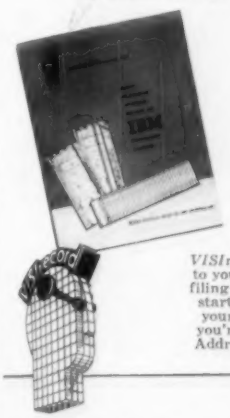
The new system is expected to further expedite mailing of Curtis publications, among them, The Saturday Evening Post, Holiday, and The Ladies Home Journal.



PLAGUED BY PUNCHED CARD PARALYSIS?

If your punched card billing or order writing system isn't producing as fast as you'd like, don't blame the machines! They're no faster than your operator can feed them. *Outmoded filing systems are unfit companions for today's high speed processing machines.* Give your machines—and your operators—a break! Provide them with a new "modern as tomorrow" *VISI*record system for fast, effective, visible control of punched master cards, card sets or prepunched decks. Among the many advantages you'll gain are—

- "Split Second" Random Card Selection
- Constantly Visible Indexing
- Fast, Foolproof Refiling
- No Card Slippage or Binding
- No Drawers, Trays, Compressors
- Minimum Card Wear and Tear
- Maximum Productive Machine Time
- Greater Employee Satisfaction



Write now (or clip and attach this ad to your letterhead) for *VISI*record's answers to your punched card filing problems. Then start congratulating yourself on the time you're going to save. Address Dept. BA-1.

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The world's fastest visible record keeping system

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Eye Surgeon Develops Korean Typewriter

A noted Korean eye surgeon, frustrated by the task of translating medical textbooks into the Korean language, designed a typewriter to mass produce the difficult Hangul language. His name is Dr. Byung Woo Kong.

The problem before him in 1944 was not an easy one. Basic characters in the language are consonants, double consonants, sub-consonants, vertical and horizontal vowels—any three of which can appear in two spaces to produce a syllable or word. The consonants appear above the center of the type line, while the sub-consonants are typed directly below. The horizontal vowels fall between. Several characters are identical, except for position on the line above, below, or between other letters. Dr. Kong solved the problem of the sub-consonants by placing them on "dead" keys which do not advance the carriage. The pilot model of the Hangul typewriter was completed in 1948, Smith Corona began manufacture in 1953, and today the typewriters are available in standard, electric and portable models.

Dr. Byung Woo Kong

For his own use, and for future mass production, Dr. Kong has also designed a combination Korean-English portable typewriter. Also built by Smith-Corona, each type pallet contains an English and a Korean character. Depressing the shift key produces Korean. When one of the 15 sub-consonants on dead keys is struck, the carriage does not advance. When the same key is struck to type an English character, the carriage advances normally.

Dr. Kong has also designed a Korean teleprinter, with which he hopes to establish a Korean nationwide communications network. Meanwhile, he keeps up his practice as an eye surgeon and specialist at his clinic in Seoul, which is the largest private eye hospital in Korea.

IBM Opens New Plant

A new manufacturing plant near Rochester, Minn. was recently dedicated by International Business Machines Corp. The plant produces machines for the firm's Data Processing Division.

Following the dedication address which was delivered by Dr. Laurence M. Gould, president of Carleton College, Northfield, Minn. an open house was held. Visitors saw the advanced manufacturing facilities where 21 different models of data processing machines, including card punches, collators and interpreters are produced. These devices are key components of IBM's small, medium and large-scale computing systems, including the 700-series of business and scientific computers and the SAGE air defense computer made for the U. S. Air Force.

Computers—Tomorrow's Test Market

Computers may make it possible to forecast with greater accuracy the behavior of consumers in response to marketing programs which are under consideration, according to C. Joseph Clawson, director of consulting services for Facts Consolidated.

Speaking to members of the American Marketing Assn. in Chicago, Clawson predicted that, "as in the simulation of the probable flight of an intercontinental ballistic missile for a space rocket, it may soon be possible to give trial flights to promotional programs on electronic computers.

"I believe that there are many indications that the decision-and-action process of consumers will soon be simulated, or at least reduced to a systematic set of mathematical functions which can be programmed onto a computer," Mr. Clawson stated.

NABDC Elects Bruning as President

New officers of the National Association of Blueprint and Diazotype Coaters include, left to right, Herbert F. Bruning, president of the Charles Bruning Co., Inc., president; L. W. Bramwell, president of the San Diego Reproduction Products Co., vice-president, and B. K. Elliot, Jr., vice-president of the B. K. Elliot Co., NABDC treasurer. The association is composed of 36 manufacturers of ultra-violet light sensitive reproduction materials in the U.S. and Canada.

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ACME VISIBLE

speeds the availability of source material

provides accessible filing for the products of

AUTOMATION

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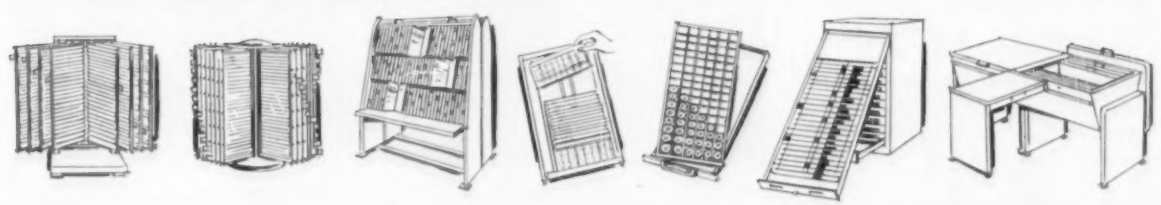
ACME CARD HOLDERS with edge punched cards speed data input into high speed computors for tabulation and payment of fees to song writers and publishers. Conversion to this efficient automation control reduced personnel 50%, space 75% and increased production over 400% because now 40,000 cards do the job that formerly required 1,000,000 cards.



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Acme makes the most complete line of visible record equipment in the world. Let us show you how to save time, labor and money with an Acme Visible Record System designed to meet your specific requirements.

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☐ Have representative call. Date_____ Time_____

Company_____
Attention_____
Address_____
City_____ Zone_____ State_____

For More Information Circle Reader Service Card No. 2-56

Systematics Names Canadian Distributor

Systematics, Inc., manufacturers of Intercouplers, will be represented in Canada by the Visirecord Co., it was announced in New York by Systematics President, T. A. Bruinsma. Visirecord, headed by E. R. Deeks, has offices in Toronto, Montreal and Ottawa. Mr. Fred Wagner, previously Systematics representative in Canada, will join the Visirecord Co.

Burroughs Sets Record

The ElectroData division of Burroughs Corp. set a new personal record during the first week of December when it shipped over $1,200,000 in commercial electronic computers and data processing equipment from its Pasadena, Calif. plant.

This rounded out a month which saw $2.3 million in computers shipped from the plant. The shipment figures do not include military guidance computers and data processing systems manufactured for the Atlas missile and SAGE continental air defense programs.

Customers include Citizens Gas and Coke Utility, Indianapolis, Ind.; General Electric Co.; Allstate Insurance Co., and the Georgia Institute of Technology.

Specialist Joins NABAC

A specialist in bank operations—Harold F. Roach—has joined The National Association of Bank Auditors and Comptrollers Research Institute.

According to Research Institute President Franklin D. Price, Roach will be working with the research director and other members of the Institute's staff to provide the necessary link between the researchers and the bankers and to facilitate greater understanding between the two groups. Said Price—"He will assist the director in guiding the work of the research teams to avoid duplication of effort and to determine that all areas pertinent to the banking research are investigated." Before his appointment, Roach was cashier of the South Shore National Bank of Chicago.

Chapman Promoted

Revell M. Chapman has been named director of market research and product development at The Standard Register Co., Dayton, Ohio. The announcement was made by Robert Zinn, vice president in charge of sales, who added that Chapman has developed an organization and control procedure for product development, which centralizes a number of functions formerly performed by other departments.

Formerly marketing director, Chapman was graduated from Princeton University. He joined Standard Register in 1936 as a sales representative, became regional manager in Newark, N. J. in 1948, and was made marketing manager in 1955.

IIT to Install Computing System

A new electronic computing system, the Univac 1105, will be installed at the Illinois Institute of Technology this spring to expand the Institute's problem-solving capabilities. It will be operated by the Armour Research Foundation.

According to Dr. John T. Rettaliata, IIT president, the Institute will use the 1105 for educational and research activities, for the Foundation's industrial and governmental research projects, for a continuing program of assistance to the U.S. Department of Commerce, Bureau of the Census, and for processing data that will be obtained in the Decennial Census of 1960.

First Delivery of Burroughs 220

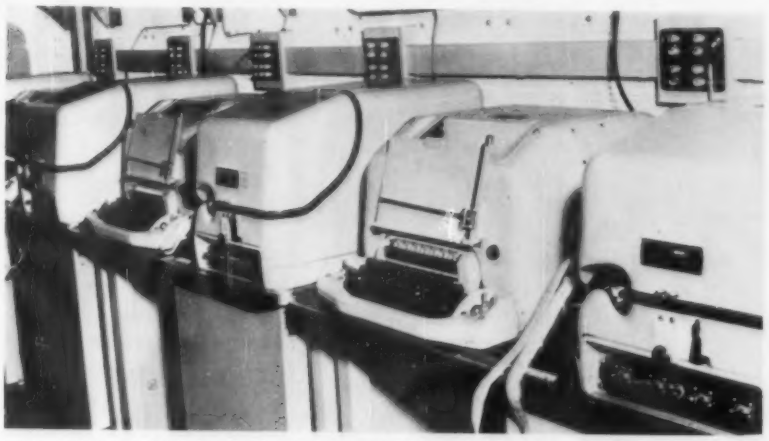
James R. Bradburn, Burroughs vice president and general manager and James D. McLean, president of Hoffman Laboratories Division.

First delivery of the new Burroughs 220 electronic data processing system was made recently—to Hoffman Laboratories Division of Hoffman Electronics Corporation in Los Angeles, at a cost of $800,000.

The announcement was made by James D. McLean, Hoffman Laboratories president, and James R. Bradburn, Burroughs vice president and general manager of the Electro-Data Division, Pasadena.

A digital system with high-speed magnetic core memory, the Burrough 220 computes at a rate of 480,000 decision-making operations per minute. Up to 600-million characters of information can be filed electronically in the system, any record available in seconds for automatic processing. McLean said the new computer will be used by Hoffman to fulfill a classified military project.

Satellite Relay System Opens New Era



This battery of Kleinschmidt teletypewriters, one of four now in existence in the U.S., is the vanguard of satellite communications relay system which would make it possible to have thousands of printed messages sent all over the world using orbiting satellites as carriers or relay stations.

Successful operation of the satallite communications relay system in the recently fired Atlas missile foreshadows revolutionary developments in both commercial and military communications, according to David S. McNally, vice-president and general manager of the Kleinschmidt Division of Smith-Corona Marchant, producers of teleprinter communications equipment used in the system.

"Using orbiting satellites as carriers and relay stations, it will be possible to transmit within minutes thousands of printed messages all over the world without using ground or undersea cables and without further burdening the already overcrowded commercial radio air waves," McNally said.

In the Atlas experiment, teletypewriter machines and devices in four U.S. Army Signal Corps tracking stations were used, not only to transmit to the recording and broadcasting unit in the Atlas nose cone, but also to receive and process messages from the sattellite which were triggered from the ground.

Printed messages were transmitted and recorded in the satellite at the rate of 420 words per minute over four minute periods, and then re-transmitted to earth upon command at the same rate. McNally said that this capacity no doubt will be greatly increased in future tests and that by using coded tape literally millions of words could be transmitted as the "future postman of the sky" passes within range of tracking stations.

A possibility, according to McNally, is the use of satellites as relay stations for printed communications. In this case the oribiting speed of the satellite would be the same as the rotation of the earth on its axis, so that the satellite would always be over the same continent or area. Printed messages, instead of being carried from one continent to another, would be relayed from one satellite to another, and then to their destinations—all in a matter of minutes.

He pointed out that the Signal Corps already has a prototype model of a teleprinter-reperforator which can receive and print (in type and code) messages at the rate of 750 words per minute. This equipment, like the teleprinters and other devices used on the Atlas experiment, was produced by Kleinschmidt in cooperation with the U. S. Army.

New IBM Manager

New manager of the International Business Machines Corp. supply division's Concord, Mass. card manufacturing plant, is William L. MacMichael. He was formerly manager of the manufacturing plans and controls of the division. The Concord plant is now under construction; it will be the newest in the division.

Japan Gets Computer To Predict Weather

The Japanese government recently purchased a $2,000,000, 15-ton computer to predict the weather, especially the typhoons that plague the islands. An IBM 704, the 19-unit computer is being installed in the Japanese Meteorological Agency in Tokyo.

Programs for instructing the computer were developed by members of the agency who had never seen a large scale data processing system, and then tested in the United States.

Space Agency Orders High Speed Memory

A new high-speed computer memory is being manufactured for the National Aeronautics and Space Administration by Telemeter Magnetics, Inc. The memory will permit large scale computations of space problems at unprecedented speeds. Equipment incorporating the new memory is to be part of the computation facilities of the Lewis Research Center in Cleveland, Ohio.

The memory has a data storage capacity of more than 160,000 "bits." With this system, the computing equipment can transfer the information between its storage registers at the rate of more than 80,000 thirty-six "bit" computer words per second, which is more than double the previous performance. Corresponding speed increases will be achieved in all of the simple arithmetic operations.

Connell Receives Commendation Ribbon

The Air Force recently honored one of its former members for outstanding services on a new kind of "battlefield"—electronic data processing.

Lawrence A. Connell, a sales technical representative with the Burroughs Corp. ElectroData Division, was presented with a Commendation Ribbon for his work in converting Air Force personnel accounting procedures from conventional punched-card equipment to electronic data processing equipment.

General Clinton F. Robinson, president of Carborundum Co.

AUTOMATING IS A JOB FOR TOP MANAGEMENT

By Gen. Clinton F. Robinson

Carborundum's "total systems" concept, developed under dynamic leadership, provides management with facts it needs—when it needs them.

THE role of the top executive in making policy decisions relative to automatic data processing cannot be minimized. In many instances, ventures were made in this field on recommendations of lower echelons of management with disappointing results.

Executives have discovered, after the fact, that they had created an island of automation in a sea of traditional paper work systems. How to extend the system became a troublesome problem. They discovered they were growing the limb of a tree that had no trunk. Promised savings did not develop as planned. Unexpected employee relations problems disrupted operations. In the end, these executives were forced to do what should have been done before a single piece of hardware was purchased.

Each company has its own character and more or less unique set of problems. What works for one might not work for another. I am not going to presume to offer advice to others on how to run their business—I have too many unsolved problems of my own to strike that pose. I will just state my experience at Carborundum Co. as related to the subject for whatever value it may have for others. Needless to say we have benefited much by studying experiences of other firms engaged in similar projects, both in terms of what to do, and what not to do.

In relating our own experience, some background is needed which is of indirect but vital importance to the subject. Carborundum was organized in 1891 to engage in the abrasive business. It progressed into the related super refractories industry, and then into non-metallic electrical components. During the years it expanded its operations and was an important factor in the markets for its products at home and abroad.

I came to the company in 1952. My problem was not where the company had been—but where was it going? That would seem to be a relatively simple question to answer—but it wasn't. We set about to formulate the answer and developed a statement of "The Primary Purpose and General Objectives of the Carborundum Company."

After careful deliberation, the board of directors approved this statement. It constituted the blueprint for executive action. Now, with a clearer picture of the kind of company I was to help build for the stockholders, such basic considerations as automation of data processing fell into place.

Cite objectives

In relation to this step, my objectives were: (1) to make possible better direction and control of the business, (2) to provide better and faster data for day-to-day operations, and (3) to reduce administrative costs. These are stated in order of importance, but all three were final goals. These three inseparable objectives led us to the "total systems" concept at Carborundum as distinguished from the "special purpose" or "fragment" concept of some whose objective was primarily to reduce administrative costs or some other limited objective.

Short and long range planning, decentralized operations, and centralized control of performance are the three legs on the tripod of the company. These required accurate and timely information about the business. This was not available when needed, and in some important areas, not

available at all under the former data processing systems. My objective was to develop sound planning, efficient decentralized operations and centralized control. This was impossible with the old paper work systems that had developed under the formerly highly centralized operation of the company.

The foregoing might indicate that my primary objective in considering automatic data processing was better management of the business. This was true, but there were the other important considerations.

For one, all management, from the foreman level up, wanted more data, more statistics—and wanted them faster—for day-to-day operations. Complaints were general that reports were too late to be of value for improving performance. These deficiencies were present despite the fact that the company was spending a considerable amount of money on a conventional, and I believe well-run, punched card system. Talks to general managers of the divisions revealed that they were still making many decisions "by the seat of their pants." They required better and speedier information for efficient operation.

Administrative costs mount

Another problem was that administrative costs were mounting and had been for many years. Salaries and wages were increasing. But, unlike manufacturing costs, there didn't appear to be any substantial offset to increased administrative costs, even through the use of better methods, procedures or machines. It was obvious that administrative costs had risen to the point where they seriously affected the over-all profits of the company. The problems were well-defined. The next step was to solve them.

I was aware that all the figures we used in the company derived from a few basic documents. Investigation resulted in five classifications of original source data: customer orders; payroll source records; purchase documents for materials, supplies and services; physical assets as shown by capital appropriations and related records, and master information records such as customer files, product catalogs, price lists and discount tables.

Could an integrated electronic data processing system, built around these basic documents, be developed for controlling and operating the business? This brought us into the domain of experts. The problem was given to Remington Rand Research Laboratories and also to International Business Machines Corp. Much was learned from both about electronic and automatic devices and what they could do. The conclusion was that our total systems concept was not impossible. A further conclusion was that our problem was not the availability of equipment, but rather, it was our ability to use it. The computer people knew their equipment, but I was after an integrated system that Carborundum could use to achieve our three objectives.

The computer people didn't have the answer to that problem. It appeared that most companies then using large computers had installed them for applications such as payrolls, or actuarial studies, but did not have an integrated system from customer order to stockholders' report.

My decision, then, was to enlist the services of the Mellon Institute of Industrial Research and set up a fellowship to help us determine the feasibility of my "total systems" concept for Carborundum. Our treasurer-controller was directed to coordinate the whole project. Three methods and procedures men were assigned to work with the Mellon Institute.

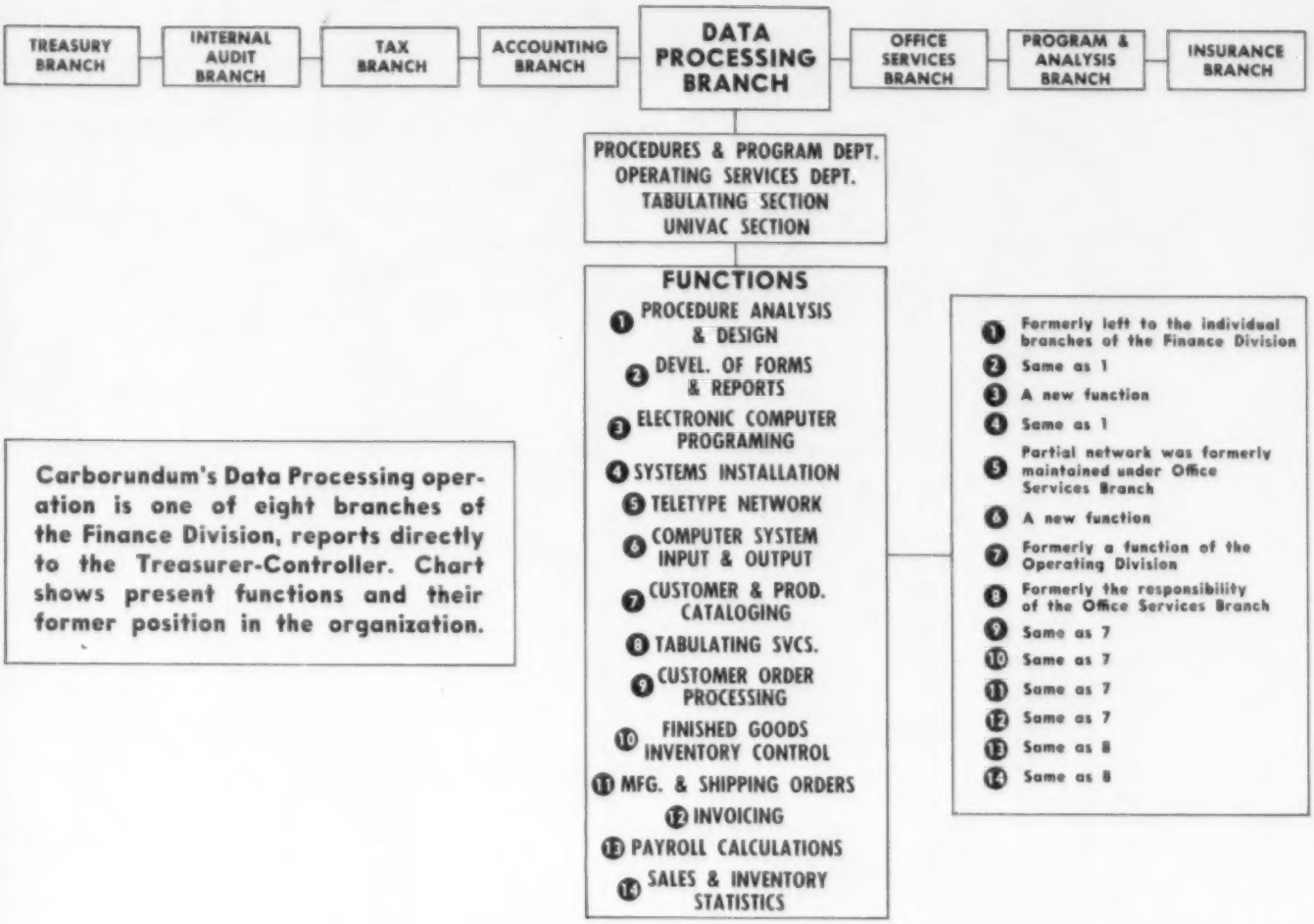
At that time, I established an electronics committee composed of staff representatives and members of the operating divisions to provide practical advice and assistance from the men who make and market the company's products, and who would be responsible for coordinating the divisions into the system.

After a thorough study of Carborundum's methods and procedures, and a survey of available equipment, a feasible integrated system was projected. The committee charted the steps from customer order to annual report and recommended the hardware to do the job. On September 23, 1955, the board of directors approved the program. After careful consideration of all factors involved, a 10-year project was foreseen, and I established a realistic timetable for starting and completing its progressive stages.

Finance division chosen

The finance division of the company was assigned responsibility for the program. I realized, of course, that this project would have to serve all functions of the business and decided that for Carborundum, the finance division was best suited for the job. The controller established an automatic data processing branch to carry out the assignment. Orders were placed with Remington Rand, Commercial Controls and American Telephone and Telegraph. Our engineers remodeled an area in one wing of the executive office building to provide necessary housing for the installation, and in December, 1956, one year after the board of directors' decision, a Univac computer was turned over to us for operation.

One other important aspect in the planning of this project was employe relations. Employes were told that the program was under consideration. They were informed when the decision was made.


TREASURY BRANCH
INTERNAL AUDIT BRANCH
TAX BRANCH
ACCOUNTING BRANCH
DATA PROCESSING BRANCH
OFFICE SERVICES BRANCH
PROGRAM & ANALYSIS BRANCH
INSURANCE BRANCH
PROCEDURES & PROGRAM DEPT.
OPERATING SERVICES DEPT.
TABULATING SECTION
UNIVAC SECTION
FUNCTIONS
1 PROCEDURE ANALYSIS & DESIGN
2 DEVEL. OF FORMS & REPORTS
3 ELECTRONIC COMPUTER PROGRAMING
4 SYSTEMS INSTALLATION
5 TELETYPE NETWORK
6 COMPUTER SYSTEM INPUT & OUTPUT
7 CUSTOMER & PROD. CATALOGING
8 TABULATING SVCS.
9 CUSTOMER ORDER PROCESSING
10 FINISHED GOODS INVENTORY CONTROL
11 MFG. & SHIPPING ORDERS
12 INVOICING
13 PAYROLL CALCULATIONS
14 SALES & INVENTORY STATISTICS
1 Formerly left to the individual branches of the Finance Division
2 Same as 1
3 A new function
4 Same as 1
5 Partial network was formerly maintained under Office Services Branch
6 A new function
7 Formerly a function of the Operating Division
8 Formerly the responsibility of the Office Services Branch
9 Same as 7
10 Same as 7
11 Same as 7
12 Same as 7
13 Same as 8
14 Same as 8

Carborundum's Data Processing operation is one of eight branches of the Finance Division, reports directly to the Treasurer-Controller. Chart shows present functions and their former position in the organization.

The industrial relations division collaborated with the finance division and the operating divisions in establishing employe relations policies to insure that employes understood the purpose of the project and how it would affect them. Group meetings were held with the employes directly affected. Specifically, these things were done:

1. Each affected employe was evaluated for work in the automatic data processing branch.
2. Employes were given opportunities to fill openings if their training, experience and aptitudes qualified them, and if they wanted to do the work.
3. They were trained in their new assignments, if training was necessary.
4. The company discontinued hiring in other divisions in the Niagara Falls area until all excess employes were given a chance to transfer to other openings for which they were qualified.
5. New employes were hired only to fill openings not filled through the above procedure.
6. During the transition from the old system to the new, short term jobs were filled by temporary employes from other sources such as Manpower, Inc.

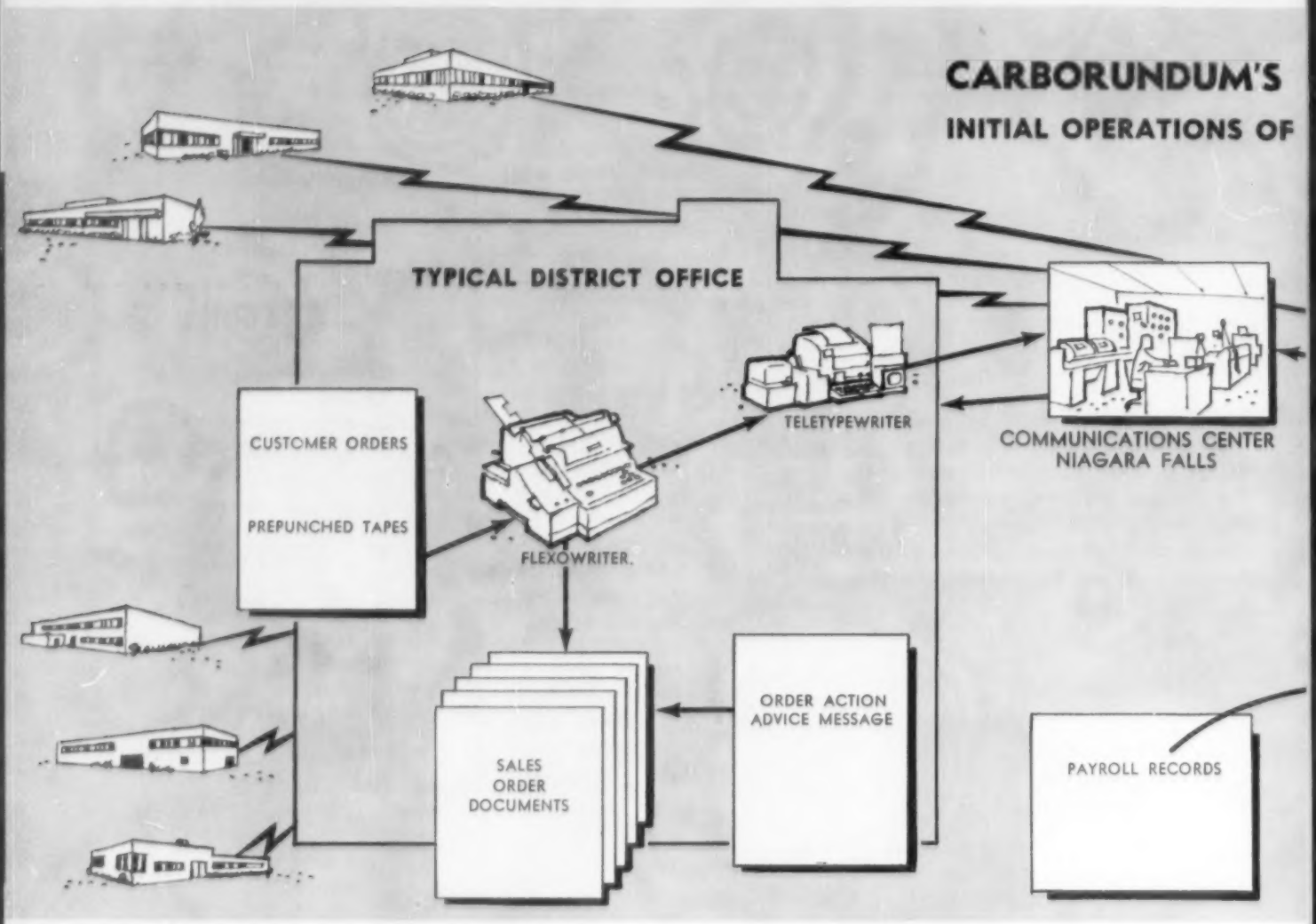
As a result of these policies, to my knowledge, no regular employe has been laid off because of installing the automatic data processing system at Carborundum, despite the fact that administrative employe costs have been substantially reduced since September, 1955. Furthermore, no employe morale problems have arisen. They seem to be proud of the system which they help to operate.

After three years

Now, where do we stand three years after the board's approval of the project? Present major automatic data processing activities encompass:

1. Order processing, inventory record keeping, billing, sales accounting, and sales activity reporting for the three abrasives divisions.
2. Salaried payroll for all domestic locations.
3. Hourly payroll for all domestic locations.
4. Property accounting and depreciation records for all domestic and Canadian locations.
5. Certain scientific and engineering problems of the research and development division.

The 12 district sales offices throughout the United States are coordinated in the system.



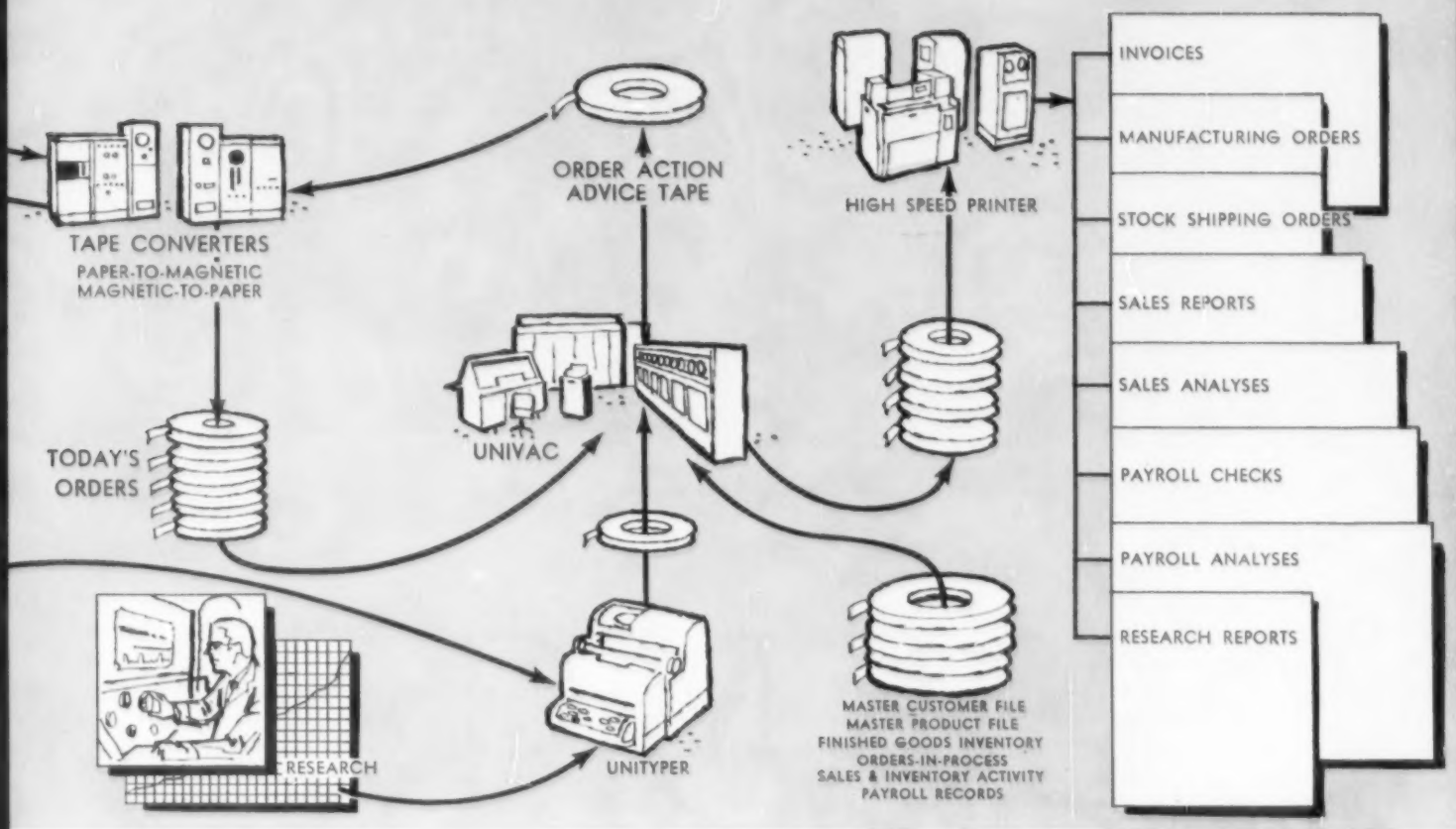
The third objective—reduced administrative costs—is in sight. We are now operating at a breakeven point and believe we will recover out-of-pocket, start-up expenses in the next five to seven years.

The second objective was timely information for day-to-day operations. Approximately one thousand orders are processed every 24 hours. The three abrasive divisions know where they stand daily on orders and customer service. Reports include customer sales analyses, five different product sales breakdowns, stock status reports for our largest division, and tax reports. Operating divisions have just begun to get what they want—when they want it—and are pressing for additional reports.

The first and primary objective was timely information for improved direction and control of the business. The previously mentioned activities are presently expediting analysis of company operations and providing more up-to-date and accurate information for periodic progress reports, all of which help toward better planning. However, this phase has just begun. The present Univac I is operating on a three-shift basis processing or producing operating documents, records and reports. The preparation of management control information through data reduction and analysis is the phase into which we are now entering. To help accomplish this, an additional Univac I will be installed early in 1959, which is in keeping with our original plans. This will provide a full complement of equipment to carry out a logical extension of present operating systems, and the utilization of operating data for better direction and control of the business.

AUTOMATIC DATA PROCESSING

"TOTAL SYSTEMS" PROGRAM



Future projects for the system include (1) automatic stock replenishment, (2) production scheduling and plant loading, (3) production accounting and reporting, (4) raw materials requirements, (5) accounts receivable, (6) organization performance reporting, (7) general accounting, and (8) cost accounting.

We have been preoccupied with the three abrasives divisions up to the present, but I am pressing for all divisions of the company to be on the system by 1963. We have scheduled the "total systems" automatic data program to be an accomplished fact by 1965, achieving in the interim, progressive realization of our three-fold objectives —better direction and control of the business, better data for day-to-day operations, and lowered administrative costs.

In my opinion, automatic data processing is not an appendage to traditional business operation. It is a new tool to revolutionize management methods. Therefore, what to do with it is intrinsically a decision for top management to make.

Far from being a glamorous fad, automatic data processing is a fast-moving, basic trend in modern business. It seeks to apply the techniques of automation to administrative areas in the same manner as automation is engineered into manufacturing operations.

It constitutes a challenge to management's imagination and ability to understand its possibilities and its diminishing limitations and to use it as a tool to accomplish management objectives as responsible stewards of business progress.

Punched merchandise tickets are inserted into the portable Electronic Recorder which reproduces coded data on a sensitized tape.

EMC

A New Way Out of Inventory Problems

ONE OF the nation's largest department stores —the Jordan Marsh Company of Boston— has successfully pioneered the installation of Electronic Merchandise Control, a system designed to provide an accurate daily record of the movement of goods.

The new system virtually eliminates the possibility of clerical errors in recording merchandise movements and insures against the loss of sales tags. It reduces one-minute manual copying of transfers and credits to a one-second, one-step machine operation.

The program got underway over four years ago when the Jordan Marsh Company began to study the possibilities of bringing an electronic record-keeping system into the picture. The "first-phase objective" was a system that would provide the New England firm with fast and accurate records of movement of goods. Merchandise control, always a major concern in department store operations, had become a matter of even greater consequence as the trend toward branch stores gathered momentum.

"Conventional merchandise control measures," says Howard W. Davis, vice president in charge of store operations, "could not cope with the

Daniel T. Green, Jr., merchandise control manager of Jordan Marsh Co.

Punched card accounting machine provides sales analysis, shows trends, keeps perpetual inventory, and gives information about styles, colors and sizes of merchandise on hand.

problems that arose from the increase in internal traffic between main store and branches. We started out with a fairly clear picture of what we needed. Unfortunately, there was nothing on the market that filled the bill."

The result—two firms teamed up to produce a new system, Electronic Merchandise Control, currently in operation in 10 departments of Jordan Marsh's women's ready-to-wear. The program is now well beyond the experimental stage and is regarded as a first stride toward the large-volume retailer's dream of mechanized recordkeeping for purposes of merchandise movements, inventory and buyer guidance.

On-the-spot recording

Electronic Merchandise Control involves an on-the-spot means of recording all of the data contained in garment punch tags. Through a recording device which employs the "Thermo-Fax" principle to enter the punched holes as black dots on sensitized tape, the need for hand-writing of transfer slips and credit transactions has been eliminated. By means of a data converter linked with standard key punch equipment the dots on the tape are converted into punched cards which may be processed through conventional tabulating equipment.

Through the utilization of these cards which are derived from the Electronic Merchandise Control system Jordan Marsh is at the threshold of its "first-phase" objective.

The operation of EMC is sufficiently proven so that Jordan Marsh officials can think in terms of extending its use to additional departments of the main store and branches in the year ahead.

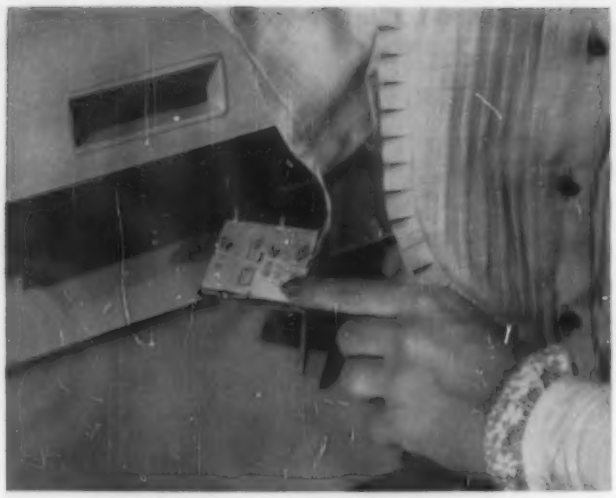
"It appears to us," says Vice-President Davis, "that 1959 will be a big year in Electronic Merchandise Control. Now we know just what it can do for us."

"Actually," the General Store Manager points out, "we knew the general problem area before the branch stores came along. The operation of branches, however, intensified our need for a systematized means of handling goods movements."

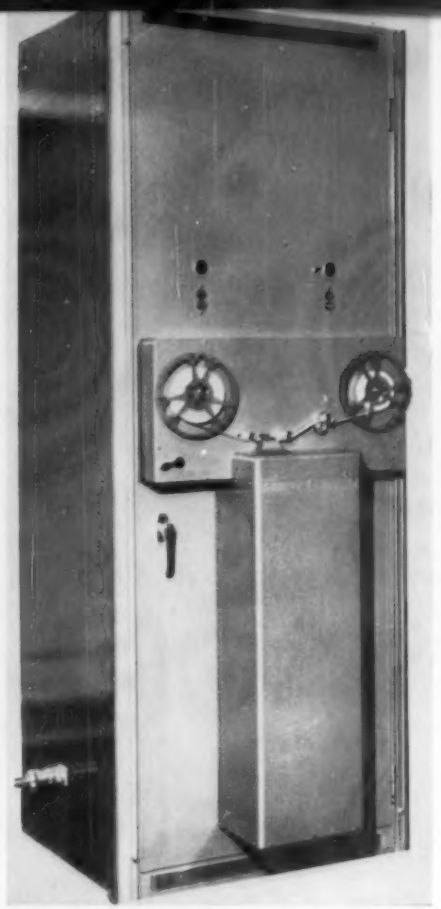
Jordan Marsh branch stores are located in the Boston suburban towns of Framingham, Malden, and Peabody. Inventory-taking at these locations has produced interesting—although unlikely—statistics. It frequently appeared that branches were selling merchandise which had never appeared in the branch inventory. These discrepancies resulted from the fact that the sale at the branch was more accurately recorded than the original transfer of merchandise.

By the same token, it was possible to have goods on hand at a branch which, according to the records, had been sold. This could easily come about as the result of a customer return in which a clerk failed to write up an accurate credit slip or where a garment tag was lost. As a result, this information would not get into central unit control records thus preventing the merchandise from being picked up as "on hands."

As far back as ten years ago Jordan Marsh



Key to control program is this portable Thermo-Fax Recorder which copies punched tag information on sensitized tape, eliminating manual recording errors.



Merchandise Data Converter transmits this information from the printed tape to any standard key punch machine.

began to explore means of automatic recordkeeping as a possible solution to the control problem. It pursued this to the extent of installing its Merchandise Control Unit which utilizes conventional punched-card data processing equipment to obtain sales and volume information.

"From this experience," says Davis who for eleven years served as controller of the company, "we developed an approach toward more and better means of mechanization."

The Jordan Marsh concept Davis speaks of is an approach toward increased mechanization by evolutionary rather than revolutionary means.

"Perhaps," he explains, "a million dollars a year could be saved through writing sales checks automatically. Despite this sort of a possibility we felt that, in the long run, our best interests would be served by streamlining merchandise records rather than money records."

What sort of advantages?

As Jordan Marsh officials see it, even at this comparatively early stage of the game, there will be—

Better utilization of clerical manpower.

Reduction of markdowns and shortages through more efficient recordkeeping.

Fewer lost sales because of out-of-stock conditions.

An example of how this works out in practice is demonstrated in the fact that a completely machine-tabulated report on merchandise movements in the 10 "test" departments of women's ready-to-wear (including branches) is ready for the buyer by nine a.m.

Time lag hurts buying

In the past, when manual merchandise controls means were used, this buyer would not get his hands on such information until three or four days later.

"A period of three or four days can be just the time in which a style or item become especially 'hot'," says buyer Frank Harrison. "An up-to-the-minute report can help you spot a trend while there's still time enough for you to do something about it!"

Through EMC it will be possible to remove the element of the "educated guess" for merchandise ordering. Buyers will have substantial statistical data to weigh along with their own experience in making important decisions. This should be re-

flected in a need for fewer markdowns, because there should be fewer instances of error by default.

Clerical personnel need no longer spend minutes writing up transfer tickets and customer credits. This now is achieved in a one-second operation. Since there is no need for tickets to be removed from the garments there is little likelihood that tickets will be lost or misplaced.

As a result of the accurate recording of all movements of goods it will be possible to develop perpetual inventories. These will disclose shortages not merely in terms of total dollar-volume shortage by department (the conventional form of current shortage analysis), but in terms of specific items right down to style, size, and color.

Shortages commonly are figured at about 1% of gross department store volume and markdowns amount to 6%. The saving of any part of this would represent a rather substantial sum in a business that grosses well over $100 million a year.

Management approves study

Electronic Merchandise Control got its initial impetus when Davis, then controller, obtained top level management approval for a look into the possibilities of an automatic system that would suit the needs of the Jordan Marsh operation. This study continued over a period of time and others came into the picture: William Tilburg, Davis' successor as controller, and Daniel T. Green, Jr., merchandise control manager.

Their basic objective: To obtain some means of doing away with hand-recording of merchandise movement information through development of an automatic system.

"This was, in a sense, a piece-meal objective," says Davis. "But it fits in with our concept of progress by evolutionary means."

The greatest interest and best understanding of the company's objective was shown by the Printed Electronics Corporation of Natick, Mass. As a result Printed Electronics formed a subsidiary company, Automatic Records, Inc., which went to work in the development of a system that would enable Jordan Marsh to use its punched garment tags as the basis of an automatic merchandise control system.

Automatic Records design engineers went to the Minnesota Mining and Manufacturing Co. of St. Paul, Minnesota, with their ideas for a system that would utilize sensitized tape to record the coded data punched into the garment tags in the form of tiny holes.

Working closely together the two companies finally came up with the answer—the first control system employing a printed tape to record data. The 3M "Thermo-Fax" principle is the basis of the recording system. A special recording device, the EMC Electronic Recorder, is used to obtain exact impressions of garment tags on sensitized tape. This tape is actually "Thermo-Fax" copy paper in roll form ⅝-inch wide.

The Recorder, called "the black box" by the Jordan Marsh personnel who use it, was designed with an eye toward low cost and mobility. It is light and small enough (15″ x 15″ x 9″) so that it may be placed on wheeled carts to be used right at the garment racks or wherever desired.

Approximately 600 tags may be recorded in a single reel of tape. Well over a million transactions (transfers, credits, return of damaged goods) will be recorded in this manner, in a normal year, in the departments where Jordan Marsh currently uses EMC.

The punched holes of the garment tags appear as black dots on the sensitized tape that is taken from the Recorder.

This is where a second basic piece of EMC equipment enters the picture; the Electronic Data Converter developed by Automatic Records, Inc. This unit which stands 69″ high and takes up the floor space of a medium capacity floor model air conditioner is located in Jordan Marsh's central Merchandise Control Unit.

"We have only one such unit at this time," Daniel Green, the unit manager, says. "It is our understanding that at the machine's present capacity for processing data, one converter can handle the volume of about 50 recorders. This being the case we have not reached our current capacity since we have from 20-30 recorders in operation."

Converter catches errors

The EMC Data Converter reads the tape impressions at the rate of 15 impressions per minute. It detects errors, torn or improperly punched tags and scans each digit of information from 50-150 times before transmitting the information to the card punch machine.

The Jordan Marsh EMC is linked to Remington Rand punched card tabulating equipment. The data converter transmits directly to a card punch machine which enters the coded information from the garment tags into compatible punched cards. From this point on the system follows the pattern of standard punched card accounting.

There are summary punching and sorting operations and then the processing of cards through tabulating equipment to furnish reports and analyses as desired.

Incoming garments have conventional Dennison tags punched and placed on them. The garments are placed on racks and a clerk with a

portable Recorder moves out among the racks to make a permanent record of this new merchandise. When the data processing run is complete each department received incoming merchandise reports which they post to their central unit control (stock) cards.

These stock cards are maintained by general merchandise classification and style. Information on the punched tags furnishes classification, style, size, color, season, and price—a total of 26 digits of data.

Every move of a garment is recorded on tape. Nevertheless the garment tag remains intact.

"The only alternative to this system," according to Harrison, "would be a multipart garment tag with numerous stubs. This is the last thing in the world we would want."

The simple two-part Dennison tag remains on the Jordan Marsh garment at all times. It is placed upon a protruding plate and thrust briefly into the recorder. The recording operation requires about one split second.

Tags were removed

Prior to EMC, in order to obtain sales-volume data from the punched garment tags, it was necessary to remove the tag from the garment. The tags were "read" by a device which extracted the sales information. It was not, however, capable of obtaining any additional information. Furthermore, there was the constant loss of tags to plague the unit control recordkeepers.

"This new computer is out of this world!"

Nor was this the only problem. As the tag had to remain with the garment until the time of customer purchase, all records of incoming merchandise, transfers and returns, had to be recorded manually. This led to the usual assortment of posting errors, such as wrong stock numbers, transposed prices and other clerical blunders that added confusion to the control records.

Reports now accurate

As a result of EMC the stock cards, which are the basic source documents of Jordan Marsh's unit control system, are accurate and up-to-date as to when merchandise is received, sold, transferred, returned, in transit (to or from branch) or on-hand. Reports in printed form are furnished stock control clerks in file-order sequence to facilitate posting.

"The beauty of this," Green explains, "is that the information we need is obtained from a single price tag—the same price tag—as many times as may be necessary."

There is no predicting the direction that expansion of EMC will take at Jordan Marsh. In the women's ready-to-wear divisions of the more than 100 year old New England store there are approximately 75 departments which could easily make use of the system now utilized by ten.

At this point the Jordan Marsh investment in Electronic Merchandise Control stands in excess of $20,000.

"This is a substantial sum of money," Davis stated, "but it may prove to be a drop in the bucket if we are now headed—as we believe we are—in the right direction on automatic recordkeeping."

The old adage of retailers big and small applies to huge department stores as well—you can't sell what you don't have on hand.

"The problem of being 'in' on all styles, sizes, and colors is something we are sensitive to," Davis says. "We expect EMC to enable us to always have what our customers want . . . when they want it.

We expect no delay in the flow of goods from the main store to the branches, no empty spaces on shelves, no disappointed customers—and minutes and hours have been traded for split-seconds in making this possible.

"As it stands now," Davis summed up, "it is safe to report that we have attained our 'first-phase objective.' For the immediate future it is our plan to secure our foothold on the frontier of fully-automatic recordkeeping and to expand this system to allow us to extend its potential to other areas of Jordan Marsh operations."

Sales information is translated to machine code on the audit slip in the cash register.

An MBA Product Preview

New Electronic Reader Speeds Data Input Into Computer

The electronic reader takes the audit strip right from the cash register and translates the printed code into common machine language to be fed into standard data processing system.

An electronic reading device which accepts as input an ordinary paper audit strip prepared on a cash register has been announced by Sweda Cash Register, Inc.

The device, an E-3 Electronic Audit Strip-Reader, is capable of reading 100 lines per second and supplying the information as direct input into an electronic computer system. The reader can also operate off-line, recording the information on magnetic tape, paper tape or punched cards.

Developed by the electronics department of the Sweda factory in Sweden, the E-3 was demonstrated at the recent Computer Exhibition at Olympia, England, and will soon be available in this country.

The E-3 Reader represents another breakthrough in the development of character sensing equipment. The paper audit strip is printed in the Sweda Cash Register as individual sales are recorded. Sales information is automatically translated into a special machine code as the sales are registered. At the close of each business day the strip is removed from the register and processed by the Reader.

The E-3 translates the printed codes into common machine language and feeds it into any standard data processing system.

The electronic reader is the latest in a series of input devices for automatic data processing released by the Sweda company. Already developed and in production is a punch tag attachment, which will automatically punch from 12 to 24 digits of sale information as a sale is recorded at the cash register, and a paper tape punching device which records sales information from the register. The latter is available in five or eight channels and handles alphabetic and numeric data.

Used for communications between departments, the Sun-Times speedy automatic pneumatic tube system is the first to be installed in a United States Newspaper.

Chicago Sun-Times Sets Pace With Automated Inter-Com System

COMMUNICATIONS between departments is no problem at the Chicago Sun-Times. When Chief Mail Clerk Stanley Kapustka wants to rush an important telegram to City Editor Karin Walsh, he simply fires it into a bullet-like message carrier, dials the number of the editorial department directly on the carrier, and shoots it into a four-inch tube. Some thirty seconds later, the carrier bounces into the editorial department and Mr. Walsh has his telegram.

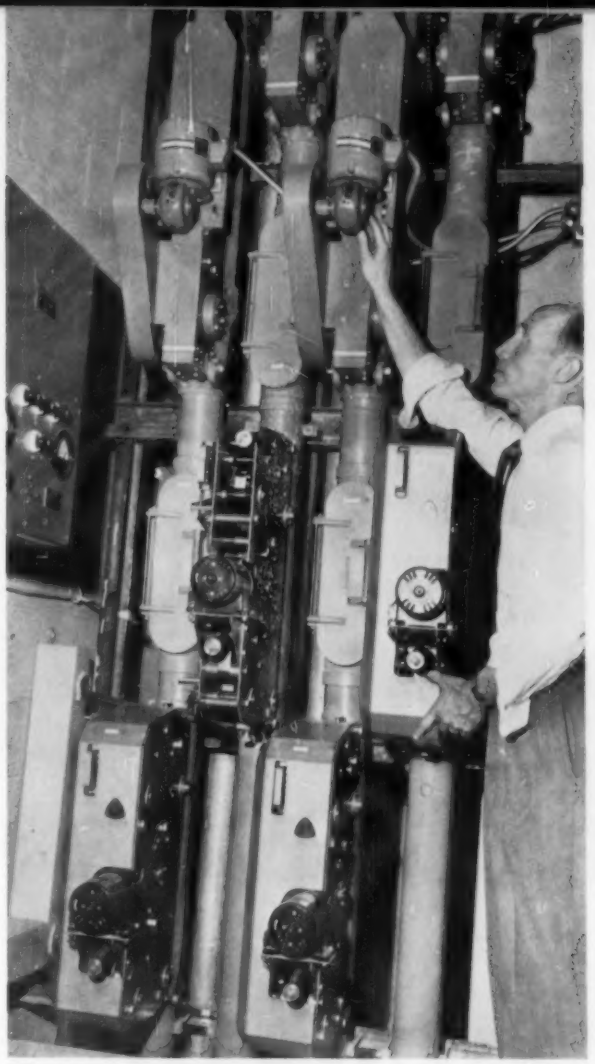
Such rapid intercommunication service is possible at the newspaper because of a fully automated pneumatic tube system, the first to be installed in a United States newspaper. Once a message carrier is popped into this vacuum system, it can travel to any one of 26 stations at a speed of 25 miles an hour—without being touched by human hands until it is opened at a receiving station. This is because the system has a relay panel, or "brain," which automatically plays the role of traffic cop 24 hours a day. It reads the signal dialed into the carrier rings, actuates the proper line and station switches, and immediately speeds the carrier to the correct outgoing line and station. Proper destination is determined by "brush contact." Two pre-set brushes project into the tube and touch the rings of the carrier traveling through the receiving line. If the distance between these brushes and the electronic contacts in the rings are equal, the carrier stops at that particular station. Traffic jams are prevented by special locks which hold back carriers when the tubes are in use.

Because the Sun-Times tube system is fully automatic, it has many advantages over manual and semi-automatic pneumatic installations. In manual systems, like those found in many department stores today, each station's sending and receiving lines are channeled to a central desk where carriers must be transferred manually from one tube to another. Manual systems are widely used today, but a recent trend is toward the automatic. In an automatic system, no central station is necessary; one station can communicate directly with another without intermediate manual handling. Up to 10 stations can share common sending and receiving lines, called "loop" lines. The Sun-Times has four of these loop lines which are channelled together at a central intersection, or "Mae West." Because of the loop lines, automatic systems require much less tubing than manual systems.

A comparison between a manual system with 15 stations and an automatic installation with the same number of stations shows that the manual system requires 23 pneumatic tubes and 10,000 to 12,000 feet of tubing, while the automatic setup calls for only six tubes and 4,000 to 5,000 feet of tubing. The automatic system can handle up to 1,200 carriers an hour, while the speed of the manual system depends upon the speed of the operator at the central desk. It is also easier to add stations in an automatic system because they may cut into an existing line. If a new station is desired under the manual system, it is necessary to install a pair of tubes from the new station to the central desk. The capacity of the Sun-Times installation is 41 stations, but automatic systems are available with possible capacities of hundreds of stations.

A semi-automatic system is very much like an automatic one. It has the same arrangement of

Once a carrier enters the Sun-Times pneumatic tube system, it is guided automatically until it reaches one of the 26 receiving stations.



The main relay panel—or automatic "brain"—reads the signals dialed into the carriers and speeds them through the tubes at 25 miles an hour.

stations and tubes, and 10 stations per loop line, but instead of an automatic "brain," the system has a small central desk similar to the manual system where an operator redispatches carriers sent from one station to another.

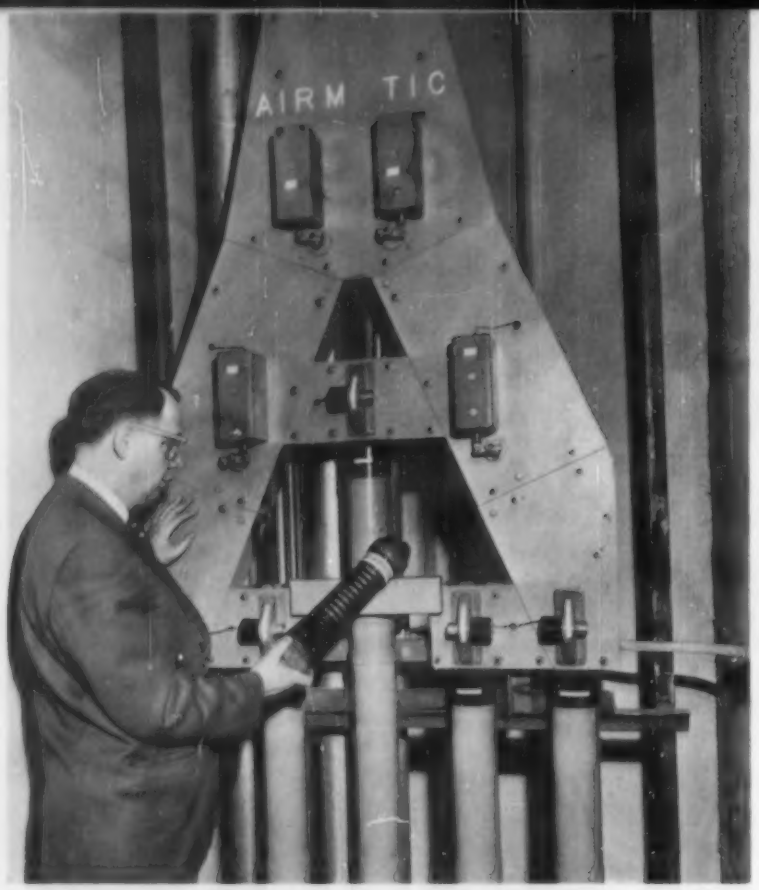
The inside of a Sun-Times carrier is roomy enough to hold a complete edition of the tabloid newspaper. Each carrier has 14 rings, two with digits from one to nine for dialing the receiving station, and 12 "contact" rings. When a station is dialed, the number rings are electronically connected with the contact rings in one of 99 different combinations.

Operation of the automatic system is smooth, even when the people sending messages make mistakes—like forgetting to close a carrier, inserting it into the system backwards, or dialing a nonexistent station number. When this happens, the main relay panel automatically senses something is wrong, and directs the carrier to the Communications Center, or "reject" station. There, an attendant corrects the error and sends the carrier on its way; or, in the case of a nonexistent station, sends the carrier back to its home base.

If someone accidentally lets the air out of his station's tube, or if there is a mechanical failure in the system—like a short circuit, a switch breakdown, foreign matter in the tube, or a carrier jamup—the trouble is immediately pinpointed on a lighted signal control panel. The particular loop involved is automatically put out of order and while the system's full-time engineer is working on the trouble spot, the rest of the system remains in operation. The signal control panel also provides for easy monitoring of the system; a glance will tell which lines are being used and to what stations the carriers are heading.

When a department closes for the day, it reports to the Communications Center. With a flick of a switch, all of the department's traffic is automatically channelled to the center where it is opened and either dispatched back to the sending station or held until the department again resumes operations.

A German invention, the automatic pneumatic tube system was introduced in the United States in 1951, but, according to a leading U. S. manufacturer of the system, Airmatic Systems Corp., it is "still in its infancy." Automatic tube systems are now being used for communication in office



Web of pneumatic tubes automatically linking every department of the Sun-Times is checked by B. W. Dusek, Assistant Controller. Electronic controls dispatch tube carriers to 26 sending-receiving stations in less than a minute.

buildings, hospitals, factories, meat packing plants and banks. The size and type of business is an important factor when selecting a pneumatic tube system for interdepartmental communication. A simple manual system might be all a small operation would require, while an organization the size of the Sun-Times would be completely bogged down under such a system. Cost of a system and length of time required to install it will vary with the type of installation and the construction conditions. In the case of the Sun-Times, the newspaper management saw the need for a rapid intercommunication system long before its modern nine-floor building was erected on the north bank of the Chicago River. So plans for the automatic pneumatic tube system were incorporated right into building plans. This eliminated the need to cut expensive holes in the walls of an already constructed building. Initial work on the installation was begun soon after groundbreaking ceremonies in 1955, and the system was ready for use when the Sun-Times staff moved into their new quarters in October, 1957.

Since communications play a vital part in the smooth running of a large daily newspaper, the Sun-Times has also automated communications in other areas of its operation. An electrically-driven, "sandwich-type" belt carries news and feature stories from the copy desk in the editorial department to the composing room at a speed of 400 feet a minute. Photographs travel from the editorial to the engraving departments in a similar manner. Unlike typical conveyor belts which run in a straight line, this belt snakes up to the ceiling, around a few turns, and back down again to its destination. Such a device can be applicable not only to newspapers, but to business in general, for speedy handling of paperwork.

Another automated device—an overhead tote conveyor—carries cuts, mats and proofs between the advertising dispatch department and various stations in the composing room. These conveyors and the sandwich-type belts complement rather compete with the pneumatic tube system which is used exclusively for interdepartmental communication.

The Sun-Times is "completely sold" on its automatic tube system, for several reasons. The system is faster than even the most fleetfooted messenger boy in the days of old, and is a big improvement over the manual system the newspaper had in its old building. And it provides departments which may be several blocks apart with immediate and private communication—all with a minimum of tubing and a maximum of efficiency and flexibility.

The need to cut high costs and delays in preparing large business applications for computors is much in evidence. Will new programming aids provide the answer to these problems?

Automatic Programming— Fact or Fancy?

By H. N. Laden

YOU will never benefit from automatic programming if you do not use it. You will not use it if you do not understand it. You will never try to understand it if you feel it is beyond you.

This is an attempt at a thorough exposition of automatic programming of digital computers, chiefly through an orderly arrangement of its principal vocabulary and suitable definitions.

The vocabulary itself will help the executive defend himself from his programming staff—and the claims of the computer manufacturers. The definitions are primarily derived from various glossaries of the American Management Association and the Association for Computing Machinery.

In addition to describing automatic programming, we consider its advantages, its practical applications, and its shortcomings and limitations. We also review its current state of development and where it seems to be going. It is hoped that this will provide the perspective for reasonable executive judgments about automatic programming and its effect on get-ready costs in applying electronic data processing equipment to business applications.

Admittedly, there is over-simplification here, since this is intended chiefly for business executives concerned with electronic data processing rather than programmers.

However, many of the latter, and their employers in the computer industry, seem to have a fuzzy view of the structure of automatic programming as a coherent science, lost as they are in the fine detail of some narrow aspect. Perhaps simplification may be more widely useful than one might initially suspect it to be.

Before delving into the workings of automatic programming, it would be well to quickly review programming in general. Basically, programming involves giving a series of instructions to a computer. These instructions consist of a set of characters defining an operation to be performed and generally also defining on what it is

to be performed. The latter is commonly referred to as "operand." Simply stated, the operation is a verb demanding action (add, stop, transfer, multiply, etc.), while the operand is a noun which usually describes the object of the action often by telling where it is located in the computer. For example, in payroll computation, the instruction might tell the computer to multiply (operation) hours worked (operand) by selected (operation) rate of pay (operand) and to locate (operation) the pay rate (operand) in a fixed position of the computer.

These instructions are communicated to the computer in machine code, the highest level of language which the computer can understand without help from a programmer—the language of specific verbs and nouns for which the computer was originally designed.

Maximum flexibility possible

Automatic programming makes use of the same structure, but greatly simplifies the problem of instructing the computer and, in addition, enables the programmer to obtain maximum flexibility from the instructions. The development of automatic programming is the story of the creation of new languages more and more closely approximating the English and block diagrams in which the system designer normally expresses the design of a new business system, and less and less indicating the particular hardware he proposes to use. The computer can, with the programmer's guidance, understand this other, more sophisticated language, because it can make use of its arithmetic and logical capabilities and its ability to store and retrieve the contents of dictionaries to translate from a foreign to its own language.

Why make the computer understand a foreign language? Two reasons are apparent:

1. Machine code is very detailed and specific. A large number of such elementary instructions are required to do a modest job. Writing these can be pretty tedious.

2. An intelligent programmer realizes there are clusters of instructions which he is using over and over again. In several problems, for example, he may compute a square root or sort three names contained in memory into alphabetical sequence. He wants to exploit his once-done coding repeatedly without added effort on his part.

One way to accomplish this is by use of "subroutines." These are not always short, as the name might imply, but can be entire routines. The programmer learns to save recurring pieces of coding. He even trades with other programmers to get a still bigger library of routines and subroutines. The library necessitates a good filing system, and each subroutine is given a descriptive but brief name which tells the programmer what operation it performs and on what kind of data. He also characterizes the data involved, not by its source (such as in payroll or inventory control), but by the format, i.e., by the number and organization of the characters used in each item. Each of these characterizations is labeled as a "call-word."

When the programmer's file becomes voluminous, and he wearies of copying subroutines, he puts the entire library on tape and makes the computer search for, prepare and copy whatever subroutine he asks for by "call." Hopefully, he could prepare an entire payroll by just telling the computer which subroutines to string together. In doing so, the programmer would talk to the computer in "call-words," not in machine code.

This is the very essence of automatic programming—the introduction and use of a language more sophisticated than machine code—a language in which the verbs can be very complex transforming actions and in which the object nouns are not simple memory positions, but descriptions of the form of complex data.

In the gap between the language of business

The Author

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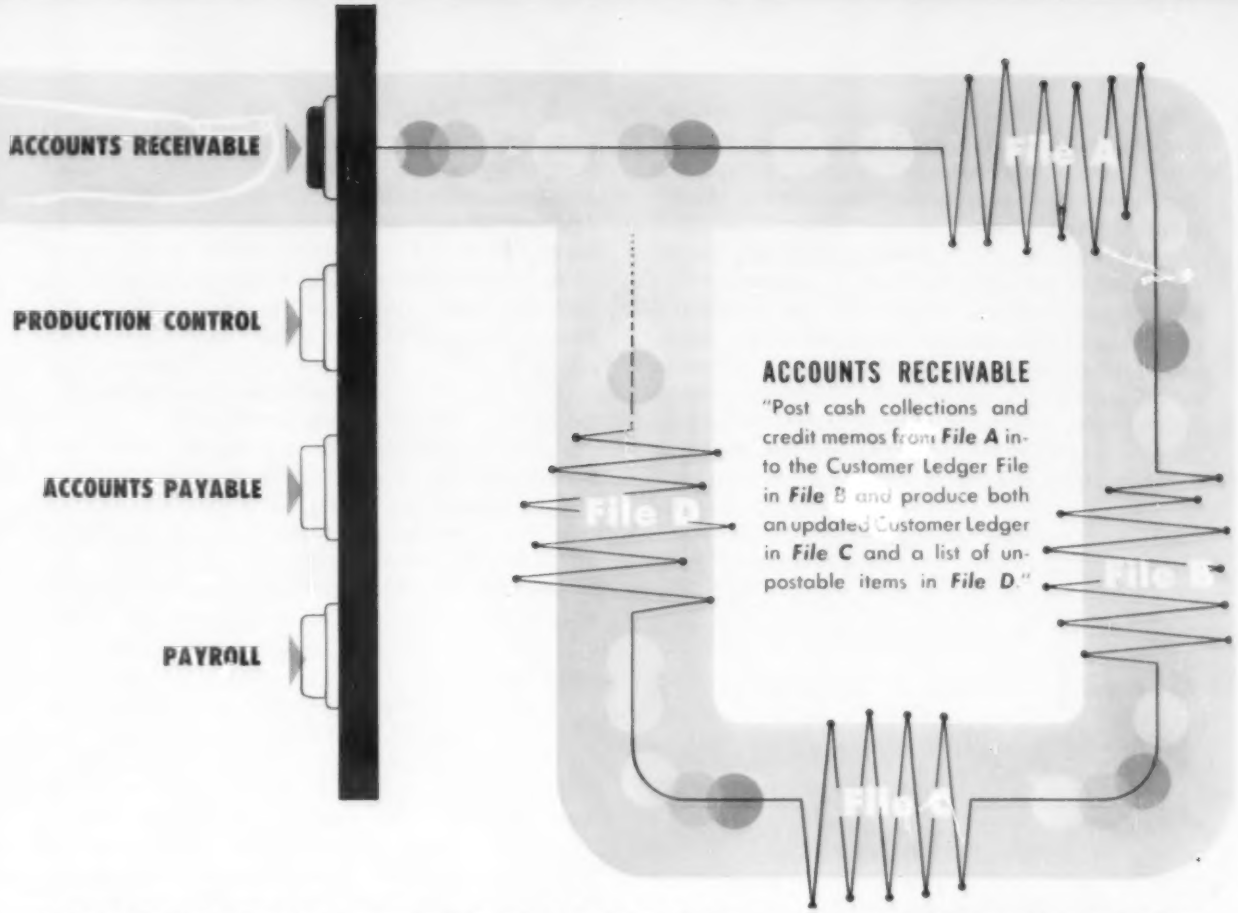

ACCOUNTS RECEIVABLE
PRODUCTION CONTROL
ACCOUNTS PAYABLE
PAYROLL
ACCOUNTS RECEIVABLE
"Post cash collections and credit memos from File A into the Customer Ledger File in File B and produce both an updated Customer Ledger in File C and a list of unpostable items in File D."
File A
File B
File C
File D

AUTOMATIC PROGRAMMING of TOMORROW?

procedures and machine design, we may have several layers of translation from higher level to lower level languages until the computer is faced with pure machine language. This is accomplished through the use of "pseudocodes."

Theoretically, every general purpose computer could accept a description of a problem solution in the same pseudocode. The automatic programming systems for different computers would differ in the dictionaries they would provide and in the specific operations they would perform to effect translation of the problem solution into machine code.

Some subroutines are problems

Subroutines, though a tremendous programming aid, can still offer some problems. The programmer may find that the coding was initially written for a specific occasion or that it assumes availability of a specific portion of memory. It may have begun with the computer assumed to have reached a specific condition as a result of prior processing. In short, the coding may be altogether too specific and the programmer will soon become weary of making minor adjustments and recopying the subroutines. How does the programmer overcome this condition? First, he picks out those sections of a routine which he wishes to save and writes them in relative or symbolic addresses.

In introducing the flexibility of non-absolute coding, the programmer makes each subroutine more widely useful. At the same time, he puts into his library some special routines which will automatically adjust his non-absolute coding to absolute addresses.

Another direction for making the library have wider adaptability is to write general rather than specific routines, i.e., to write routines designed to solve a class of problems. The coding may have "holes" in it which are filled in with specific data supplied by external instructions. With this goes a new type of routine called "generating routines." For example, there are generators which will produce sorting routines, editing routines, and the like.

Once the programmer has built up such a powerful apparatus, he introduces a masterminding routine to control the way the computer goes about all this business. Such a routine is called an "executive routine." One or more executive routines is at the very heart of every automatic programming system. Two types of

executive routines are of utmost significance. They are the "interpreter" and the "compiler." An interpretive routine has two phases, the interpretation phase and the execution phase. The people who pay for computer time get pretty impatient about paying for a repeat of the interpretation phase every time they run the production system. They ask whether the translation phase can't be done once for all time before going into production. The result would be machine coding as if it had been produced by an old-fashioned programmer. This leads us to a compiling routine.

Compiler handles several jobs

The compiler can accomplish several functions, although it may not be called upon to do all of these in any one particular instance. The compiler can:

1. Decode—examine individual characters or groups of characters and their relative position, and thereby decide what meaning they have in the pseudocoded program.
2. Convert—change numerical information from one number base to another (e.g., decimal to binary), from fixed to floating decimal or vice versa.
3. Select—choose a needed subroutine from a file of subroutines.
4. Generate—produce a needed subroutine from parameters which plug holes in coding or which induce the computation of a specific routine.
5. Allocate—assign storage locations to the main routines and subroutines, thereby fixing the absolute values of any symbolic addresses. Sometimes this involves breaking up a routine into segments which will fit at one time into a prescribed section of memory.
6. Assemble—integrate the subroutines (whether supplied by the programmer, selected directly from the library or generated by the computer) into the main routine. This, in itself, involves adapting the general subroutines to the specific process by means of preset parameters; orienting the coding, i.e., changing relative and symbolic addresses to absolute form, and incorporating the coding by placing it in the storage prescribed for it.
7. Record—produce a reference list of the machine operations and their positions in the final compilation (specific main routine) and containing information describing the segmentation and storage allocation of the routine.

Is such a fantastic routine possible? Not only is it possible—but available. In the area of scientific computation, there are more compilers than we have a need for and some of them are already being discarded.

Virtually every computer has at least one assembly system which permits coding in nonabsolute form. There are scientific compilers for just about every computer, commercial or scientific.

As you might expect, those manufacturers with more experience in the computer business have developed further in automatic programming. However, there has been a tremendous amount of interchange of basic philosophy and theoretical developments between personnel of different manufacturers. As a result, there is an amazing degree of similarity of approach.

One sensational outcome is the recognition that, for scientific problems, it is not especially difficult to establish a universal pseudocode. An international conference has started the task of establishing a world wide pseudocode for scientific problems and regulations for updating this language.

If we could reach this stage of development with the business data handling system, then perhaps we could go back to being managers and leave programming to the manufacturer's research staff. One objective of current efforts is to satisfy this need for a universal language of management system. Actually, we would be glad to get any language more nearly resembling English and mathematical formulas for describing our business and scientific problems along with automatic programming systems accepting such language. If all manufacturers could settle on a single language, so much the better.

Another objective is to maintain flexibility in the automatic programming systems. While this

Can't go bowling, Ed—too much homework!

is being ignored by some manufacturers and pursued haphazardly by others, flexibility is a "must." We are rapidly learning about business problems, about effective computer design, and about programming techniques. For example, an analytical theory of high-volume computer sorting is still in its infancy. Any language and translating mechanism we invent at any one stage of development is, at best, optimum for all the problems we know about at that time. Hence, we can be sure we will need to revise our concepts about the proper content of any automatic programming system. Some of the systems being offered today reflect a healthy appreciation for this need.

"Simulators" help in changeover

Another noteworthy development is a special class of routines called "simulators." Several computer manufacturers are bringing out new and revised models. The problem then arises of not only making it possible to code for a new machine, but to debug the coding and test the system on an old machine. The simulator makes the old machine simulate the new one by translating line for line of machine codings. Also, a simulator can make it possible to run an old system on a new machine until it can be reprogrammed.

All manufacturers are not approaching this matter with a long range point of view. If every related model understood the same pseudocode, with the differences in automatic programming systems providing the necessary differences in accommodation between standard pseudocode and the particular models involved, then debugging and even running a system designed for a later model on the current machine would be a cinch.

At least one manufacturer has said, "To heck with call-words. Build subroutines right into the computer. Then, the call-word will be just another machine instruction." This is nothing sensationally new. It is really one of the oldest ideas in the business. All you do with the plug-boards of your punched card equipment is to wire in subroutines. Many punched card calculators had floating decimal arithmetic subroutines, logarithms and other mathematical functions wired into their control panels. Every computer using punched card input and output devices provides a facility for using the associated plug-boards to wire in input and output control and editing subroutines, which can often be called upon by as little as a single control punch. That control punch is your library call-word. So you see how familiar automatic programming can really be.

With all the advances in automatic programming, only recently have we begun to get mature systems for use in business applications. Assembly systems and other pieces of automatic programming structure are fairly common among computer manufacturers. But full-blown business compilers are rare and the object of intensive research. The main obstacle is in the lack of standardization of business practice.

If we tell controllers that all accounts receivable systems should be blocked out for computers in an identical way, they'll call for a straitjacket. However, we are finding more and more in common among segments of different accounts receivable systems. As a result, we begin to develop a pseudocode in which the sentences now say: "Post cash collections and credit memos from File A into the customer ledger file in File B and produce both an updated customer ledger in File C and a list of unpostable items in File D." Such a sentence is completed with descriptions of the files involved.

We will see progress in this direction on two accounts. First, the systems analyst and the operations researcher are learning more about a business system as a communications network with control points, more about a scientific basis for segmenting it into standardized units, the functions of each of which can be described in a highly restricted language. Secondly, we "hurt so bad" about the costs and delays in getting a large business application on a computer that we are going to make occasional compromises of compelling our new business procedures to conform in its parts to already well-classified and pseudocoded operations, so that we might exploit what is available in programming aids.

Manufacturers lag behind

The manufacturer must help. But not every manufacturer has responded with equal foresight. Only a few appreciate that the development of a suitable automatic programming system for a new computer is very expensive, takes very high caliber people and tends to extend over a long number of months. As a result, some compilers will reach the customer after he has struggled into operation.

In the case of certain manufacturers, the research team developing an automatic programming system for a new computer participates directly in the company committee laying down the logical design. Development of the machine for production and of the automatic programming system parallel each other. The product announced is a computer plus a programming system. The customer can proceed with his system planning well in advance of arrival of his hardware. This makes sense.

One other development is worth loud mention.

Virtually every computer system has its user organization. I would have no pride in office as president of the Univac Users Conference if I failed to mention this. Each user group interchanges a tremendous amount of programming information ranging from coding tips to entire automatic programming systems and entire business applications studies. Every automatic programming system produced by a manufacturer has been drastically expanded by the user organization.

Here are advantages

If we restate why we want automatic programming, you will have a summary of its advantages, the contributions it makes and the needs it fills:

1. Save money and time in training. Straight coding is a very artificial and obscure language. It takes too long to teach people in business to use it well. Some never make it. Let us restrict its use to very occasional situations and to programming experts. Automatic programming languages are more natural to the applications designer, easier to learn and easier to remember.

2. Reduce the time and cost in coding. Programs in pseudocode require fewer lines of writing, are in a more natural language. Hence, they can be produced more quickly and accurately. Automatic programming also permits large applications to be broken down into simpler segments for independent programming by members of a team, with assurance that the pieces can be properly strung together.

3. Reduce the time and cost of debugging. This follows from fewer mistakes in pseudocode, from rebugging by parts through which mistakes can be localized more readily. Also, there is less opportunity for, and likelihood of, manual errors in transcribing the program into the computer medium. There is just that much less to debug.

4. Flow charts of individual routines can be executed much more rapidly and more accurately. This follows from two characteristics. Established subroutines and routines can be referred to by call and do not need to be charted. Second, we tend to exploit the system by compelling the flow chart to use the libraries. That is, it provides ready access to the generalizations of many prior charts and hence, charting tends to consist more of drawing analogies and less of original endeavor.

5. Similarly, the overall process chart of the composite of routines for a production system can be arrived at more readily.

6. The delay and cost in conversion from problem definition and system design proposal to a computer process chart can be substantially reduced. A high level pseudocode approximating basic business English would constitute a suitable language for expressing the design proposal in the first place, and no extensive conversion to a process chart would be necessary as a manual effort.

7. Procedures study, problem definition and system design can be accelerated. This again comes from the fact that, at any stage of development, the existing pseudocode vocabulary tends to suggest how to define the problem and how to sketch its solution. The vocabulary inevitably is a dictionary of useful analogies and generalizations.

8. Automatic programming will make it easier and, hence, cheaper to make the changes almost always required in a business system to keep it current. Sometimes, it is the only way to do the job fast enough.

9. Automatic programming will make it more economical to update your computer.

10. Automatic programming makes it practical to program one-shot business operations for the computer where time and cost did not permit otherwise.

What you don't get

Automatic programming also has a negative side. It will not provide basic fact-finding and will not test the validity of any conclusions which are likely to be drawn from these facts. It will not help analyze facts, reformulate problem definition, or reshape management objectives. It will not concoct new accounting principles and concepts. It will not sketch a new organizational structure and it will not invent any new methods and procedures.

It will not devise manual clerical procedures, nor write standing instructions, nor train clerks. It will not help with labor negotiations. In fact, it is estimated that automatic programming has an impact on only about 15 to 25 per cent of the scope of computerization. Even if all the current objectives for it were met, we might raise this figure to perhaps 40 to 50 per cent.

In scientific problems, it will not invent new approximating procedures or new methods of numerical analysis. In the case of most computers, developments for business applications cover too little territory—much promise, little delivery. Library routines are sometimes prematurely released. Sometimes, they are not adequately debugged. Sometimes they are released without suitable descriptive material and instructions for use. The main executive routines are sometimes not adequately debugged. Generated routines, by failing to take advantage of the peculiarities of a particular problem, sacrifice efficiency and hence are more costly to use in production. The thought is that a sharp coder can always beat the com-

Defining Automatic Programming

SUBROUTINE — A sequence of instructions in machine code to carry out commonly required mathematical or logical operations of greater complexity than those already present in a single instruction.

CALL—A set of characters identifying a subroutine and containing information concerning parameters to be inserted in the subroutine or information concerning the operand.

PSEUDOCODE — An arbitrary code (language) independent of the hardware of a computer, which must be translated into computer code if it is to direct the computer.

ABSOLUTE ADDRESS — The label assigned by the engineer to a particular storage location in the computer.

RELATIVE ADDRESS—The address of an instruction with respect only to its relative position within the subroutine (translated into an absolute address by addition of some specific starting address for the subroutine within the main routine).

SYMBOLIC ADDRESS — A label which identifies the field of information to be operated on or the operation to be used rather than its memory location.

GENERATOR — A general routine which accepts a set of parameters and causes the computer to compute a specific routine for further use. The parameters, among other things, may specify input-output devices to be used, designate subroutines to be used, or describe the form of record.

EXECUTIVE ROUTINE—A routine designed to process and control other routines.

INTERPRETER — An executive routine which leaves the pseudocode in the computer and translates it to computer code only as needed, during the course of computation.

COMPILER — An executive routine which, before the desired computation is started, translates a program expressed in pseudocode into lower-level languages and ultimately into machine code.

piler. Certainly, this is not always the case.

It costs computer time every production cycle to use interpretive routines. Hence, they should only be used on one-shot problems or long-cycle applications. It costs one-shot computer time to compile. Individual systems are wasteful of memory space, have restrictions on the size of routines which they can produce, do not make provision for insertion of manual coding, are otherwise inflexible.

For those computers in which latency time is significant, one generally sacrifices minimum latency or optimum programming. Because of the loss of computer time, there is a great resistance to using it for the common, short-cycle business applications. This is not true of every compiler.

Its introduction often creates, for the individual administrator of computer activity, the same personnel problem which hit the line accounting and tab shop organizations when computers were first introduced. Some programmers are downright hostile, while others may be demoralized.

Some programmers resist retraining. They worked so hard to learn one set of hieroglyphics, they don't want to be bothered with a pseudocode even if it is more nearly English. For one reason, some pseudocodes really are a mess, and

Continued on page 45

BOMARC, fired at Cape Canaveral, is guided by computer 1500 miles away in Kingston, N.Y.

Missiles Away—

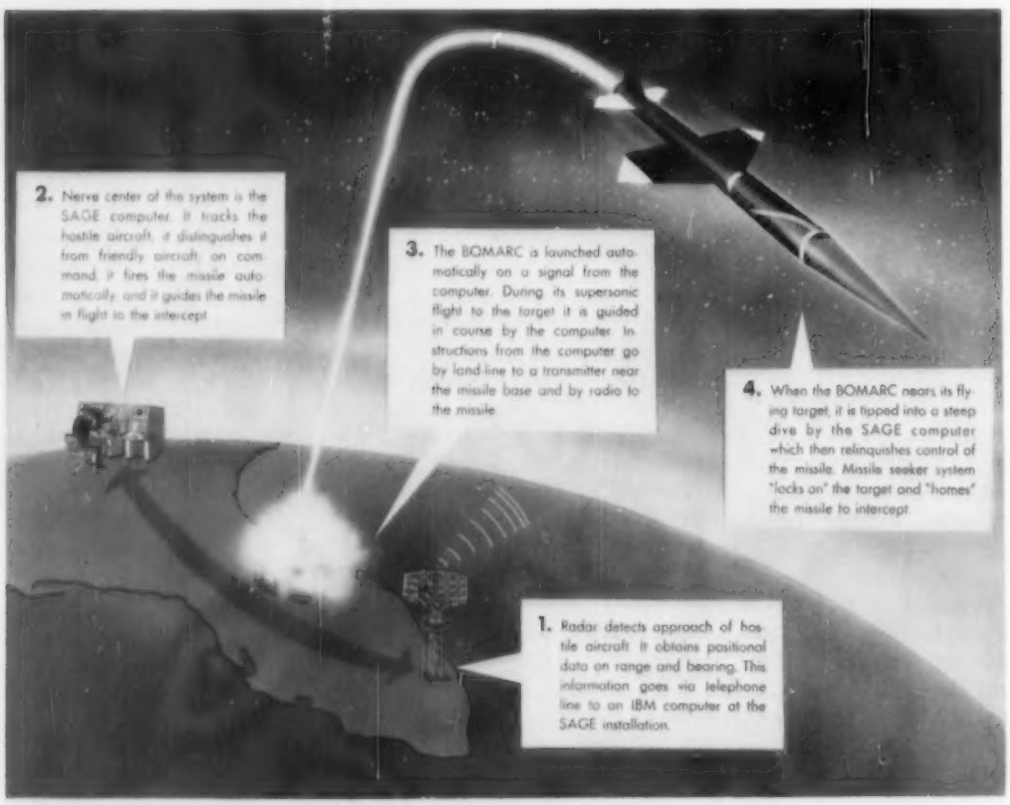
The Computer's Job Is Guidance

MISSILES roaring spaceward — whether at Cape Canaveral, Fla., or White Sands, N.M. —are, of practical necessity, in the hands of giant computers. The ability of these computers to perform complex and dramatic tasks for the military program points the way to their future use in equally complex business and industrial programs. Today, however, they are in the service.

Remote control guidance is the main task of the giant IBM computer which has been integrated into the SAGE air defense system to fire and direct a supersonic BOMARC IM-99 missile until it "locks on" target.

In actual practice, the computer, located 1500 miles away in Kingston, N.Y., has successfully fired and guided missiles launched at Cape Canaveral.

In performance of its duties, the computer


2. Nerve center of the system is the SAGE computer. It tracks the hostile aircraft, it distinguishes it from friendly aircraft, on command, it fires the missile automatically, and it guides the missile in flight to the intercept.
3. The BOMARC is launched automatically on a signal from the computer. During its supersonic flight to the target it is guided in course by the computer. Instructions from the computer go by land line to a transmitter near the missile base and by radio to the missile.
4. When the BOMARC nears its flying target, it is tipped into a steep dive by the SAGE computer which then relinquishes control of the missile. Missile seeker system "locks on" the target and "homes" the missile to intercept.
1. Radar detects approach of hostile aircraft. It obtains positional data on range and bearing. This information goes via telephone line to an IBM computer at the SAGE installation.

At White Sands, each missile flight requires approximately 500 measurements. Each of these measurements would normally require up to one hour to compute, but the computer has cut this down to approximately one second for each work load.

responds to a program which is set up in advance. This program causes the computer to do specific jobs as events occur in supersonic sequence. To control a single BOMARC firing, the computer must run through several thousand individual steps in continuous sequence.

At White Sands, a Univac Scientific is charged with the exacting task of computing and analyzing the enormous amount of data taken from each missile firing. Some 500 measurements are required for each flight, and each of these measurements would normally require between 250 and 500 hours of computation. The Univac accomplishes each work load in one second and can handle computations for as many as 10 missile firings daily.

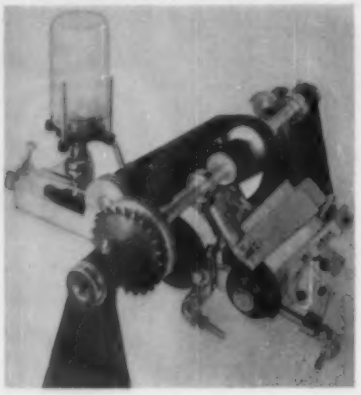
Efforts at the present time are confined to data reduction and flight simulation, but it is feasible to extend this to a closed loop on-line control in a real time operation where data would be transmitted through instruments at the observation point from the missile in flight to the computing system, analyzed and then returned . . . in time to control the same flight.

With this computer it is feasible to receive data on a missile's flight from instruments at the observation point . . . analyze this data . . . and return it in time to actually control the missile's course.

New Products

For Business Automation

Label Head



An interchangeable head for applying cut labels is available with new Cheshire, Inc., labeling machines. It can replace roll or tape strip heads now on these units. Known as the R-4700 Rotary Cut Label Head, the device can apply cut or individual labels from ⅞ by 2 inches to 3½ by 5 inches to nearly every class of printed material. Labels may be ungummed or cut from gummed stock. Circle No. 2-1.

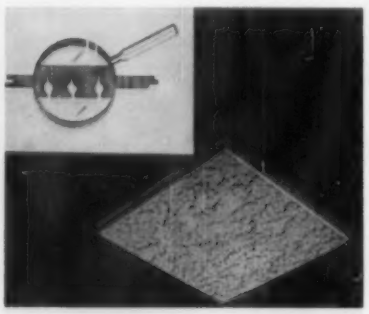
Electric Adding Machine

Some of the features of this new Model 44E electric adding machine include direct and repeat subtraction, and an automatic keyboard clearance for total and sub-total keys. Interlocking keys prevent simultaneous depression of two or more keys. Manufacturer is Addo-X Inc. Circle No. 2-2.

Alphabetic Intercoupler

This new intercoupler will automatically make a paper tape or punched cards from alphabetic information indexed on a Burroughs Series M 200 billing machine. Manufactured by Systematics, Inc., the device is expected to be valuable in translating names and addresses, catalog numbers and item descriptions automatically into computer language. Intercouplers have been used for some time in conjunction with other business machines. But, according to the manufacturer, this is the first to be developed for use with a Burroughs. Circle No. 2-3.

Acoustical Tile



A new acoustical ceiling tile called Nu-Wood Micro-Perf, featuring acoustical correction and an effect of fissured stone, has been designed by the Wood Conversion Co. for use in offices, clinics, commercial and industrial buildings. According to the manufacturer, the acoustical properties are obtained through the use of pin-point perforations that flare out into bell-shaped cavities beneath the surface of the tile. These pin-point perforations are said to afford about the same sound reducing efficiency as conventional drilled tile. Gray or beige are color choices. Circle No. 2-4.

Photocopy Machine

A single sheet of paper is used to make a copy with this new photocopy unit which will copy from all colors. The sheet comes out as a negative stat (white on black) in less than 30 seconds. The stat can serve as the finished copy, or it can be used as a master to make from one to 1,000 positive copies by repeating the copying procedure. Four positive copies can be made per minute; cost of each is about four cents. The new process is known as "Quick Silver," and the unit is made by Peerless Photo Products, Inc. Circle No. 2-5.

Photocopy Units

Copies can be made in about 20 seconds with these new photocopy units—the Transcopy Star (above) and the Mercury. They differ only in size. The Star has a throat width of 9½″, length, 22″, width, 14″, and height, 5″. Mercury's dimensions include: throat, 15½″, length, 29″, width, 14″, and height, 5″. Prints can be made under bright office lighting conditions. Exposure time is 3 seconds, processing, 8 seconds, and paper handling time, 9 seconds. Simple to operate, the units are geared to save time and money in reproduction costs. They are manufactured by Remington Rand. Circle No. 2-6.

Communication System

An executive can reach any one of 20 preselected stations just by pushing a button, with this new direct line telephone communication system. A master station on his desk makes it easy for him to call preselected stations without dialing, to "camp on the line" of a busy station, to put a tone on a busy line indicating an executive is waiting, or to "cut through" to a busy line in an emergency. Manufacturer of the system is Automatic Electric Co. Circle No. 2-7.

Versatile Chart

This new chart may be an organization chart one day, and a sales graph, a comparison between products, or a marketing map the next. It is made up of adhesive-backed letters, numbers, tapes and papers which stick on a permanent grid. They come in various colors, adhere as long as desired, and may be changed in minutes. Known as Execu-flex, the chart is manufactured by The Chartmakers Inc. It is made of walnut and set off against a black lacquer base. Size is 28 by 40 inches. Circle No. 2-8.

Plastic Card Holders

These new plastic card holders designed to speed up card handling are used in bin systems for inventory control purposes. They will accommodate up to 75 standard business machine cards and are available in a variety of colors. The holders are attached to metal or wooden shelves by clips. The manufacturer, Cowan Boydan Corp., points out that the card holders minimize delays in billing because invoices can be mailed right with shipments, rather than separately. Holders are 3⅝ inches by 7¼ inches by ⅞ inches deep. Circle No. 2-9.

Pneumatic Stapler

This new pneumatic-powered multiple-headed stapler can be used anywhere that compressed air lines are available. According to the manufacturer, Staplex Co., it is "extremely rugged and dependable and is recommended for packaging, collating, and general stapling where it is desired to drive several staples at one time." A single operator can run the stapler. The unit comes with from one to six stapling heads which are adjustable and drive standard staples simultaneously. Circle No. 2-10.

Office Conveyor

This new office conveyor is designed to move paperwork within a department or between departments. Manufactured by Mercury Industries, Inc., the unit can be applied to two types of paperwork movement: progressive, where the paperwork follows a fixed movement pattern from one station to the next, or selective, where a station can send paperwork to any other station. Clerks can process paperwork as soon as it is received without leaving their work positions. Conveyors can be designed to handle almost any size form. The number and length of message lanes varies in each installation. Circle No. 2-11.

Imprinter for Burster

An imprinting attachment for its Selec-tronic Burster line has been announced by the Standard Register Co., Dayton, Ohio. The Selectronic Imprinter uses a ribbon device to make a clear, clean image from an electro, type chase, or graphotype plate, in any continuous form including tab cards. The imprinter sits behind the Burster and uses Burster power through gearing and electrical circuits. It will handle a wide variance of form lengths and depths and the impression, which can be varied to four different settings, can be preset to the desired form area without a sample run. Circle No. 2-12.

Audio-Visual Recorder

This new Ekotape 310 tape recorder makes it possible to automate an audio-visual sales message. It does this by providing sound-slide synchronization with any automatic slide projector. Instead of verbal instructions or tone signals to indicate slide changes, the slides are changed by an electrical impulse passed from the Ekotape unit to a solenoid attachment on the slide projector. This impulse is put on one channel of the tape as the voice goes on the other. The unit is made by Webster Electric Co. Circle No. 2-13.

Electric Duplicator

Ink pads which must be changed by hand have been replaced by a revolving silk screen on this new heavy-duty electric duplicator. The entire inking system is replaceable for quick color changes, and a sealed ink cartridge is used to prevent stained fingers and clothing. According to the manufacturer, Rex-Rotary Distributing Co., the machine's self-adjusting feed tray will accommodate a full ream of 20 pound paper. Any paper may be used—from index cards to legal size—without adjusting the machine, which can run off 100 copies a minute. Circle No. 2-14.

Bendix Unveils Universal Photo-Electric Tape Reader

A photo-electric paper tape reader, capable of accepting any five, six or seven channel numeric tape for computer input, has been announced by the Computer Division of Bendix Aviation Corp.

The unit was designed with the idea in mind that it can be used for reading tapes from all types of off-line recording devices. It is designated as model PR-2 reader, and it is part of the company's G-15 accessory line.

An important feature is that the new accessory is compatible with tape punching cash registers, accounting machines, adding machines, typewriters and many other types of recording equipment. Principal applications include process industry data handling, retail and wholesale sales analysis, payroll, cost, inventory control, and similar problems.

The new reader operates at 400 characters per second and will stop or start on one character. In addition to positive and negative numbers, the external code may include control characters and certain special characters. Any five, six or seven channel numeric code can be read and translated to G-15 code. Adjustments allow for acceptance of different external codes.

The PR-2 is said to accept up to 500 foot rolls of tape and is easy to load and unload because no reels are used. A special winder keeps the tape in a neat roll at all times. Circle No. 2-15.

CHESHIRE *Announces* *New* CUT LABEL ROTARY HEAD

for Model E *and* Model C

Labeling Machines

APPLIES CUT OR INDIVIDUAL LABELS
(gummed or ungummed)
⅞" x 2½" to 3½" x 5"

NOW, **an INTERCHANGEABLE HEAD FOR applying cut labels is ready for quick-change-over use on all Rotary Head Cheshire Model E and Model C Labeling Machines. It quickly replaces the roll or tape strip head on either of these units. It handles ungummed labels, or those cut from gummed stock . . . does the job accurately, neatly, perfectly at speeds up to 15,000 per hour. With the addition of the new R-4700 Rotary Head, the extreme range of both Model E and C Cheshire Labeling Machines permits applying cut labels to practically any class of printed material.**

If cut labels only are to be applied, Model E or C Labeling Machines can be supplied with the R-4700 Rotary Head in lieu of the Roll or Tape Strip Head.

CHESHIRE *LABELING EQUIPMENT*

Feeds, cuts, glues and attaches pre-addressed labels — reloads labels and glue without stopping the machine. Smashes costs, saves time. Never misses. Labels all types and sizes of printed pieces accurately, neatly, economically. Low-priced sure, easy way to prevent bottlenecks in your labeling operation.

MODEL E LABELING MACHINE
For postcards, insertion cards, envelopes, pamphlets, brochures and lightweight magazines, booklets, catalogs and quarter fold tabloids.

MODEL C LABELING MACHINE
For light to heavyweight magazines, catalogs and half-fold or quarter-fold newspapers and tabloids.

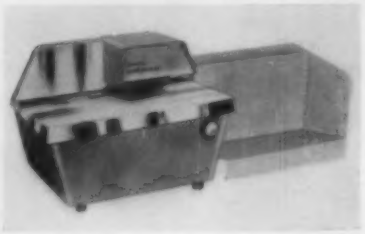
CHESHIRE, Inc. 1644 NORTH HONORE STREET CHICAGO 22, ILLINOIS

For More Information Circle Reader Service Card No. 2-57

Aluminum Flooring

A new type of flooring for data processing facilities is Elafior-Elevated Aluminum Flooring which provides modular panels raised on pedestal to permit electronic cables, heating and air conditioning plenums, water lines, and telephone wiring to run underneath. A product of Liskey Aluminum Co., the Elafior can be used to convert existing rooms for the installation of computer equipment or can be put in new construction. Panels interlock with the substructure; they can be removed in an instant. Any standard floor covering may be used over the aluminum. Circle No. 2-16.

Automatic Letter Opener



A new feed belt has been added to the Premier Auto Opener manufactured by Martin Yale Inc. The belt, which moves in a straight line and also rotates, is said to bring constant pressure against the guide for "faster, cleaner, more precise envelope opening." The electrically operated unit comes with a self-positioning scrap tray which catches both the trim and opened envelopes. It is guaranteed for a year. Circle No. 2-17.

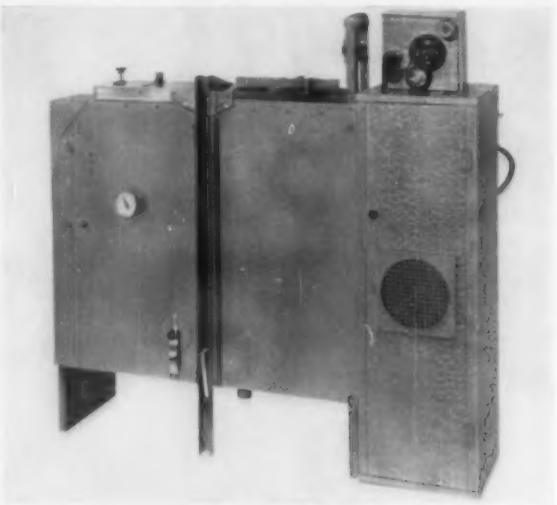
Automatic Phone Dialer

Dialing a telephone becomes a push-button affair with a new unit now being field tested by Bell Telephone Laboratories. Up to 50 frequently-called numbers can be pre-set into the device. All the caller need do is lift the receiver, move an indicator to the name desired, and push a bar—the automatic dialer does the rest. Circle No. 2-18.

Three New Aids to Microfilming by Remington Rand

Three new aids to microfilming have been developed by Remington Rand Corporation: Snap-Jacks, a new device for mounting individual microfilm frames in a filing card; the Rem-a-Dex pocket, a method of combining inactive microfilmed records with current active records, and Unipro, a unit which processes and dries microfilm at the rate of three and a half feet a minute.

The Snap-Jack technique is applicable wherever a microfilmed record must be combined with a card that contains additional information—like in engineering drawing records, deeds, mortgages and manufacturing specifications. The Snap-Jack itself is a transparent tri-acetate holder into which 16, 35 or 70 millimeter film can be inserted. The holder is then snapped into an aperture which may be either at the right or left side of the card, so that cards may be filed with the filmed images in alternating positions.



Unipro Processor

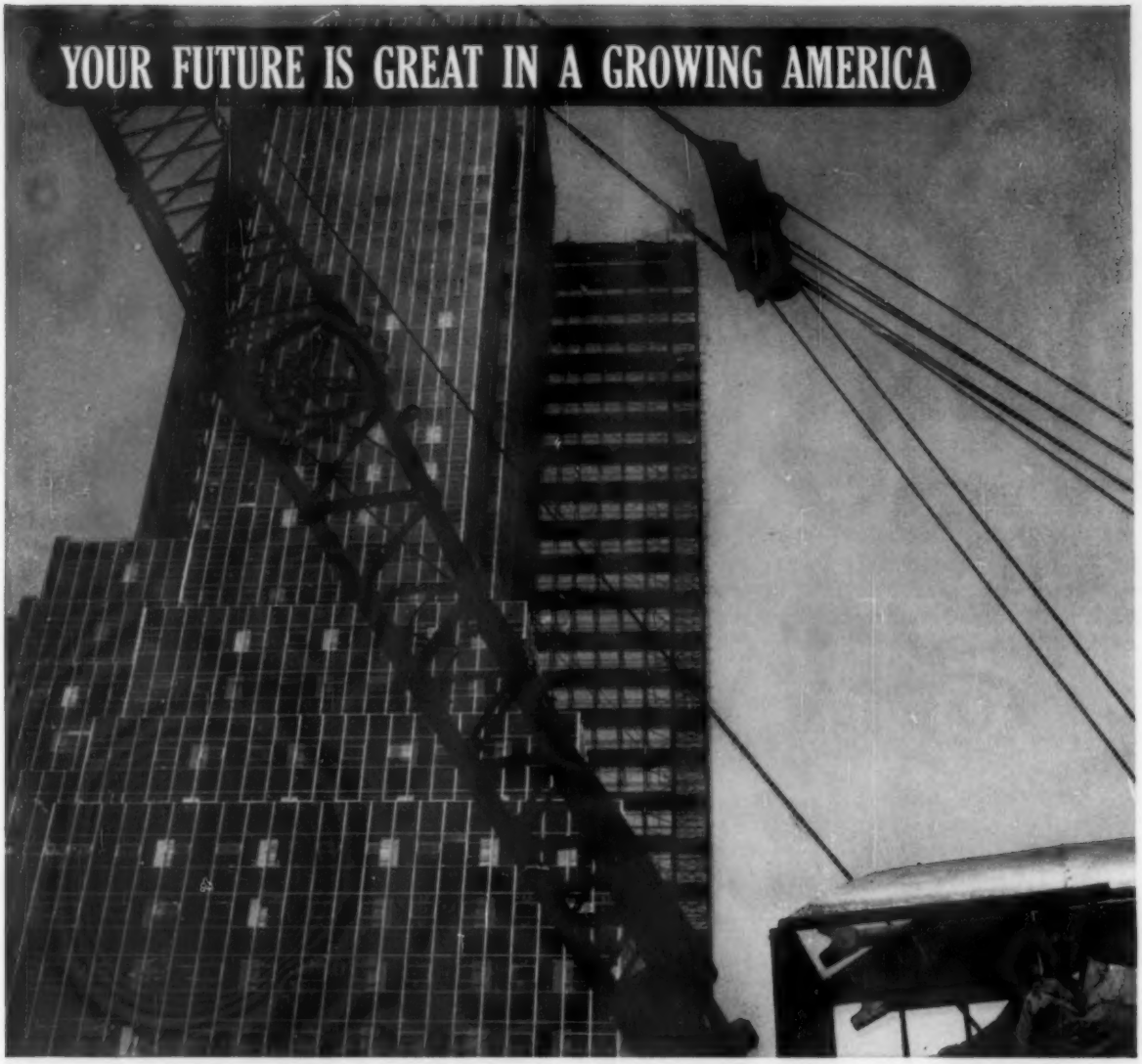
Snap-Jacks

Rem-a-Dex

The Rem-a-Dex pocket is another holder for microfilmed records. Designed to attach to any standard size folder, it makes a combination active-inactive file for quick reference. Some of its applications include credit records, trust ledger cards and manufacturing specifications. In hospitals, a patient's history, or "inactive record," may be recorded on microfilm and attached to an active folder which is made out when he returns to the hospital.

Rem-a-Dex pockets come in three standard sizes —5 by 3¼ inches, 6 by 4 inches, and punched card size. They are made of cellulose tri-acetate. Another advantage—the pockets create an index guide for the folder.

Unipro, short for universal processor, will process and dry 16, 35 or 70 millimeter microfilm, and is made for daylight loading and operating. The machine can be threaded in two minutes with a new "straight line" threading feature. Audible signals indicate when the end of a roll has been reached and special controls automatically govern the temperature of two solutions used in processing. Unipro will develop dye back, non-dye back or positive film to meet the requirements of the National Bureau of Standards for archival permanence. (Circle No. 2-19)



AMERICA ALWAYS OUTPERFORMS ITS PROMISES

We grow so fast our goals are exceeded soon after they are set!

7 BIG REASONS FOR CONFIDENCE IN AMERICA'S FUTURE

1. More People—Four million babies yearly. U. S. population has *doubled* in last 50 years! And our prosperity curve has always followed our population curve.

2. More Jobs—Though employment in some areas has fallen off, there are 15 million more jobs than in 1939—and there will be *22 million more* in 1975 than today.

3. More Income—Family income after taxes is at an all-time high of $5300—is expected to pass $7000 by 1975.

4. More Production—U.S. production *doubles* every 20 years. We will require millions more people to make, sell and distribute our products.

5. More Savings—Individual savings are at highest level ever—*$340 billion*—a record amount available for spending.

6. More Research—*$10 billion* spent each year will pay off in more jobs, better living, whole new industries.

7. More Needs—In the next few years we will need more than *$500 billion* worth of schools, highways, homes, durable equipment. Meeting these needs will create new opportunities for everyone.

Add them up and you have the makings of another big upswing. Wise planners, builders and buyers will act *now* to get ready for it.

FREE! Send for this new 24-page illustrated booklet, "Your Great Future in a Growing America." Every American should know these facts. Drop a post card today to: THE ADVERTISING COUNCIL, Box 10, Midtown Station, New York 18, N. Y.

Stencil Tabber

This Weber Tabber Model 300 has been designed for tabbing shipping stencils on continuous forms up to 20 inches wide. It will place shipment addressing stencils over the address section, or anywhere that is desired on the form, automatically and at adjustable speeds up to 2,400 per hour. It also counts forms as they are tabbed. Made by Weber Addressing Machine Co., Inc. Circle No. 2-20.

Rotary Calculator

A new line of automatic rotary calculators is now being distributed by Control Systems, Inc., under the name of "Plus Diehl." Nine models in the new line feature automatic short cut push button multiplication full back transfer, Duplex register, full cent and visible key board dials. The model shown here, the DSR rotary duplex electric desk calculator, is representative of the nine new models which will be distributed through the newly-formed Plus Diehl Calculator division. Circle No. 2-21.

Call Director

The Call Director, a streamlined, compact, push-button telephone for business office use, has been introduced by the Bell Telephone companies. The new unit, available to firms which are relocating or expanding, has a two-model choice. One is an 18-button size and the other is 30-button. Each has a sloping face and is available in four colors. This unit is said to combine features formerly provided in several pieces of telephone equipment. These include interoffice communication, call holding, signaling and conference calls. Circle No. 2-22.

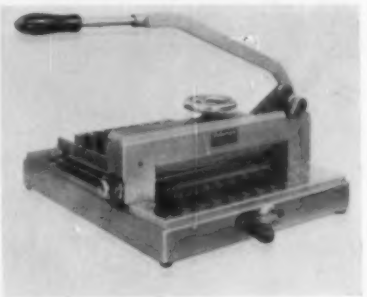
Seal Embosser

This Art portable Electraseal, Model D1, has been designed for high speed seal embossing by architects, art studios, banks, corporations, hospitals, engineers, schools, and goverment agencies. Speeds up to 3,600 impressions per hour can be obtained. Features front control button which permits exact positioning in the seal throat before seal impression is made. Circle No. 2-23.

Visual Sales System

Salesmen can carry 100 or more "samples" in their wallets with this new visual sales aid system—which consists of color transparencies in microfilm apertures and collapsible viewer. Called the Filmcard Vuedex, the system is a product of Taylor-Merchant Corp. and Filmsort Co. Product displays, room layouts and other exhibits are reduced to compact, portable form—the viewer and cards fit in a breast pocket Filmcard wallet. They can be used by salesmen, architects, builders, decorators and others to display their work, and eventually may be utilized in low-cost combination display and active stock control record systems. The color transparency in the card aperture is about 1/20 of the entire card; the rest can be used for descriptive material, trade marks, sales messages, and pricing information. Filmcards, which are of the punched card type, may be imprinted on both sides. Circle No. 2-24.

Precision Paper Cutter



Main feature of this new office paper cutter is a front wheel which acts as a calibrator for precision cutting. Said to be low in cost and and designed especially for offices with electronic bookkeeping systems that require ledger-statement sheet cutting, the machine is manufactured by Michael Lith Sales Corp. It is also applicable in duplicating departments. Known as the Triumph, the paper cutter is portable, safe, and easy to operate. The gray-green unit is available in two sizes, 14 and 18 inch models. Circle No. 2-25.

Automatic Programming

Continued from page 35

the programmer can easily feel happier with machine code.

Some automatic programming systems have been cleaned up for use about the time the machine reached technological obsolescence. Business managers are not going to standardize their operations just to make automatic programming fruitful. Hence, it may be in the position of finding limited use, at best, on a high level. It will, therefore, be forced to lower levels of problem description, where its range will be greater but its depth of contribution to the overall problem less.

Cost is substantial

The cost of developing an automatic programming system is very substantial and, of course, the manufacturer passes the cost on to the user.

In addition, there are numerous objections which can be applied to specific automatic programming systems, but this would be a long and tedious task. For every objection raised, there is a defense or at least some extenuation or amelioration.

There are several areas of management decision involving evaluation of automatic programming. The first of these is in the choice of alternative electronic data processing systems. It is maintained that fully developed automatic programming techniques and libraries of proven routines are as much a part of a data processing system as the electronics and hardware. The extent and effectiveness of the automatic programming systems available for a particular computer must also be considered in evaluating a manufacturer's preparations for marketing and sales support.

In weighing the extent of such systems, it should be borne in mind that virtually every "business" data processing establishment eventually finds itself engaged in some statistical, engineering or other mathematical computation. Hence, one should discern whether efficient scientific compilers are available. A more significant caution, since such a system is a greater rarity, is the recommendation that the computer manufacturer be probed about the availability and nature of the business compiler.

Studying the extent of such automatic programming systems must be followed by a determination of the effectiveness of the techniques. While the computer vendor will emphasize reduction of preparation costs it is important to discern whether daily computer operations resulting from use of the particular automatic programming techniques involved will be so inefficient on a continuing basis as to impose an uneconomic burden.

It should be appreciated that such evaluations involve exercise of difficult technical judgments. The business manager will benefit from learning enough vocabulary to feel at ease with his "experts."

Once a particular computing system has been selected, one may still face at a lower level of management the decision concerning which of several available automatic programming techniques for the same computer to adopt. Each one adopted requires an investment in training, in system maintenance and standardization, in research and refinement, and in group communications and control. Nevertheless, the decision is often quite properly made to promulgate a number of partially overlapping but distinct programming systems throughout the computer group. This is defended sometimes as an investment in the long-range professional development of the programming staff rather than for its immediate utility. The manager should recognize the bias of the programming technician to indulge in academic interests possibly beyond the limits of profitability.

Technique must be chosen

Finally, when a particular automatic programming system has been selected for use by a computer group, one faces at the level of first-line supervision the day-to-day decision of using manual or automatic programming techniques for a particular programming assignment. The applicability of given techniques in a specific instance is again more than a technical question. The economic aspect arises from the fact that savings from lower preparation costs for manpower and from earlier completion of the programming may be offset detrimentally by higher computer costs in computer generation of a program and in continuing operation. A saving grace is the fact that often the continuing excess operating costs, if any, are of short duration in a computer procedure for a dynamic business.

While these considerations may appear to be fraught with cautions in the evaluation of the utility of automatic programming, this is no impediment to its adoption. A careful consideration of the economic aspects should almost invariably lead to a wider use of automatic programming. Since every computer installation employs such techniques in some measure, we deal with matters of degree rather than principle.

More News

Continued from page 13

Better Steaks Is Computer's Goal

Bigger and better steaks may result from a new application for an electronic computer. The Department of Animal Industry and Veterinary Science at the University of Arkansas, in Fayetteville, has installed a G-15 general purpose digital computer designed by the Computer Division of Bendix Aviation Corp. Researchers will use the computer to help find the quickest and best way of combining quality, quantity and economy in beef steak production.

According to Professor C. J. Brown, project director, the new electronic laboratory assistant will be programmed to determine and interpret trends in production of beef cattle and allied livestock projects. Vital statistics concerning breeding, efficiency of production, mothering ability of cows, and various feeding and digestive studies on different breeding groups will be processed.

Brown says that statistical data projected over many generations of cattle will eventually take the guesswork out of breeding. Such data includes essential purebred requirements, weight of animals each month, body measurements and food required per pound of beef growth. Population trends, says Dr. Brown, indicate that "If people want to eat as well in the future as they do today, we must continue to improve our production, economically as well as numerically."

McCabe Promoted

Frank G. McCabe has been named managing editor of the Auditgram, a monthly magazine published by The National Association of Bank Auditors and Comptrollers. McCabe joined the NABAC staff in January, 1952, and was named associate editor in July, 1953. In February, 1957, he was also made director of the Association's editorial division, a post he will continue to hold.

Computer to Score Winter Olympics

An IBM Ramac 305 has been given the job of unofficial score keeper, in French and English, for the 1960 Winter Olympics at Squaw Valley, Calif.

In addition to score computations, the unit's memory file will be called upon to keep tabs on all competitors, holding a 200-word biography and an additional 200 words on past performance for each individual athlete.

Ramac's tabulations will be unofficial, until Olympic personnel check the scores by established systems, but in general it will speed up the announcement of many winners. In the past as long as five hours have elapsed after an event because of the involved manual calculations.

Because French is the official language of the Olympics, Ramac will have to learn to give its answers in that language as well as English, the alternate. All the questioner will have to do is specify his choice.

Recent Appointments

Smith-Corona Marchant—George F. Burns has been named national sales manager of Smith-Corona, with H. S. Yaffa as manager of the New York City branch and William H. Cluse as eastern region sales manager.

Comptometer Corp.—Bernard J. Farrell is now manager of administrative services to four newly established district offices in Greater New York.

Telecontrol Division, Hancock Industries, Inc.—Charles G. Mann has been named as the Detroit-area engineering representative for the firm.

Kellogg Switchboard & Supply Co.—Roy R. Marlowe is now manager of the newly re-aligned eastern regional office for Kellogg. He will direct sales activities in 10 eastern states from Syracuse, N.Y.

American Tel. & Tel.—Dr. James B. Fisk has been elected president of Bell Telephone Laboratories, research and development arm of the Bell System. He replaces Dr. Merwin J. Kelly, elected chairman of the board. Estill I. Green is the new executive vice president of the unit.

Greer Hydraulics, Inc.—Dr. Ronald Bell has joined this firm in the capacity of senior research physicist, and he will be engaged in research and developmental programs involving servo systems, transistorized circuitry and other electromechanical devices.

International Business Machines Corp.—Edwin F. Goldfuss and Louis Castaldi are now vice presidents of IBM World Trade Corp. At the same time it was announced that Edmund T. Pratt, Jr. is now controller.

General Electric Co.—Raymond W. Smith and Harold A. Strickland, Jr. have been elected vice presidents.

I. T. & T. Corp.—Robert W. Hughes, John E. Kahelin, and Charles G. Sherwood are newly elected vice presidents of International Electric Corp., a subsidiary.

Control Data Corp.—Frank C. Mullaney was elected vice president and Edward Strickland was named treasurer.

Minnesota Mining & Manufacturing Co.—Dr. Carl E. Barnes is now vice president of research and Dr. John Copenhaver is director of central research.

Eastman Kodak Co.—Louis K. Eilers has been named first vice president of Tennessee Eastman Co. and Texas Eastman Co. and president of Eastman Chemical Products, Inc.

Pacific Automation Products, Inc.—Donald Royce, senior partner of William R. Staats & Co., has been elected to the board.

W. L. Maxson Corp.—Albert E. Edwards was elected vice president of this electronics concern.

Honeywell Announces Multi-Program Unit

A new all-transistorized computer with the ability to process up to eight different jobs simultaneously —each independently programmed and automatically controlled—has been announced by the Datamatic Division of the Minneapolis-Honeywell Regulator Co. The system, called the Honeywell 800, establishes several "firsts" in the art of computer design, according to Paul B. Wishart, Honeywell president.

The most important is the ability to independently perform more than one job at a time, Mr. Wishart stated. This achievement is called "Automatic Parallel Processing. According to Wishart, the medium-scale computer is so flexible it can do data-processing and scientific computation simultaneously and in less time than it would take other systems to do either.

Two new electronic innovations, called "Traffic Control" and "Multi-Program Control," make the automatic parallel processing feature possible, M-H explains. Traffic control allows the central processor to communicate simultaneously with as many as eight input and output devices, such as punch-card readers, printers or magnetic tape units. Multi-program control enables the Honeywell 800 to divide itself into as many separate computers as there are jobs to be run simultaneously, up to a total of eight.

The basic speeds of the Honeywell 800 are said to establish new highs in the medium-scale data processing field. Maximum input or output rate has been boosted to 96,000 decimal digits per second on each magnetic tape. Internal transfer rate speeds are up to 2,000,000 decimal digits per second.

Monthly rental will range upwards from $11,000 a month for the minimum system. The system is said to require about one-tenth the floor space required by a comparable non-transistorized system and will use about one-tenth the power.

IBM to Develop Battlefield Equipment

A combat computer and a data processor, are being developed by International Business Machines Corp. for U.S. Army battlefield use. The mobile equipment, which will be completely automated and air-transportable, will be used to process data for commanders in the field. It is designed to provide continuous information during battle on intelligence, logistics support, firepower and troop strength. The high-speed mass data storage and retrieval processing equipment is being developed as part of the Army's Fieldata program. The computer unit will be designed to receive, store, and retrieve masses of battle information via remote electronic input and output; the data processor will assist commanders in coordinating operations for a group of computers in a field army. Both units are scheduled to be tested under simulated field conditions following construction.

Don G. Mitchell On Automation

"Automation fulfills the need for a broader and broader use of mechanical and electronic equipment to help man do his job, not to displace him, but to extend the breadth of man's mind and to increase the power of his hands . . . and even more important . . . to provide new job opportunities."

★

"The rate of automation will have to be increased, let alone maintained, if we are to meet the future demands of our customers."

★

"Automation will have to fill 20 million job vacancies over the next 20 years because there won't be enough people in the working force to do it."

★

"The cost of clerical employment in industry and commerce has been estimated at nearly $30 billion today, and it is still going up. Fifteen years ago there were some 5 million clerical employes, or about 11 for each 100 manufacturing employes. Today there are upwards of twice that number; the ratio is more than 16 for each 100 manufacturing employes, and that percentage is growing."

★

Electronic data processing is the gathering and processing of a wide variety of information relating to accounting, production, marketing, and so on. It is a case of taking drudgery out of paperwork, getting the job done, not only faster, but better."

★

"Like any other machine in the manufacturing plant, or in the office, the computer is a tool and nothing else. It is a tool that stands ready to do the job you demand of it, but from the standpoint of management, the most important job it can do is to extend business planning to a degree of skill, effectiveness, and speed that never even remotely have been achieved before."

★

These comments on business automation were made by Don G. Mitchell, president of General Telephone and Electronics Corp., in a speech before the Annual Conference of the Society for Advancement of Management.

Required Reading

Linear Programming: Fundamentals and Application

By Robert O. Ferguson and Laurent F. Sargent. McGraw-Hill Book Co. $10

A difficult and important subject is adroitly handled by two gentlemen who obviously understand and believe in their topic. Linear programming is a valuable new tool for solving certain types of management problems. Its use has been limited only through lack of understanding.

The authors emphasize the use and application of linear programming, rather than the mathematics and theory which so often tend to confuse and discourage management personnel. The book is divided into four sections for ease of reading. The sections, "Introduction," "Methods," "Applications" and "Technical Appendixes," are self-contained, enabling the reader to select the one of particular interest. For example, those not interested in the mechanics of the methods can bypass this section and concentrate on the "Introduction" and "Application."

This book is a welcome contribution to the further development of linear programming as new management technique.

Cutting the cost of Your EDP Installation

Canning, Sisson & Associates $55

While the title of this 200-page manual is likely to mislead some readers—the contents certainly will not. Actually, as the authors explain in the preface, this special report has to do with planning and preparing a computer site. As such, it contributes a wealth of material, all relevant to efficient, economical and tested solutions of many problems related to the physical installation of a computer.

The report draws heavily on the actual experience of six well known companies and these case histories add much authority to the manual. It shoud prove a good investment for the company considering a computer installation.

Data Processing

National Machine Accountants Association. $10

The complete proceedings of the 1958 NMAA Annual Conference at Atlantic City have been published by the association in book form and released under the title, "Data Processing." The 412-page volume contains a complete word picture of the conference, including even the questions and answers of workshop seminar participants.

Leading off with the keynote address of Thomas J. Watson Jr., the book covers 43 different subjects, ranging from "The 705 for Integrated Manufacturing Control" to "The Workshop Seminar on Thinking Ahead in Education." Many of the articles are illustrated with flow charts and diagrams.

The book should prove a valuable reference for those who missed the conference, and a good refresher for those who attended.

Recently Published

Management Principles and Practices, by Dalton E. McFarland, The Macmillan Co., $9.25. A college text in management, emphasizing the planning, organizing and controlling processes; the production, financing and marketing factors; industrial and labor relations, and personnel, administration.

Scientific Programming in Business and Industry, by Andrew Vazsonyi, John Wiley and Sons, Inc., $13.50. An attempt to develop a mathematical language—in business, rather than mathematical terms—that will help businessmen apply scientific techniques to managerial problems.

Communication in Management, by Charles E. Redfield, The Chicago Press, $5. This book is concerned with the theory and practice of internal communication in large organizations.

Modern Computing Methods, Philosophical Library, $8.75. Based on lectures given to British executives so they could better understand the theory and applications of analogue machines and high-speed digital computers.

Management Decision Making Techniques, by Franklin A. Lindsay, McGraw-Hill, $15. Mr. Lindsay shows how business problems —like probability theory—can be solved with mathematical tools (linear programming, input-output analysis, operational gaming).

Control Fundamentals, edited Eugene M. Grabbe, Simon Ramo, and Dean E. Wooldridge, John Wiley and Sons, Inc., $17. This is Vol. 1 of a three volume "Handbook of Automation, Computation and Control." The next two volumes, "Computers and Data Processing" and "Systems and Components" will be released later this year. A technical hand book, "Control Fundamentals" treats general mathematics, operations research, information theory and transmission, feedback control, and numerical analysis.

General Aniline Forms New Firm In Microfilm, Reproduction Field

Walter A. Hensel, vice president and general manager of the Ozalid division of General Aniline and Film Corp., has been elected president of the newly formed Data-Graphic Systems, Inc., of Santa Monica, Calif. The new company was formed by General Aniline and Douglas Aircraft Co. to develop new techniques, processes and systems in the microfilm and records reproduction field.

Russell S. Elsworth was elected vice president and general manager. Francis Nivens and J. Edwin Coates were elected vice presidents and James T. McMillan secretary and treasurer.

Classified Advertising

Rates for classified advertising are 75 cents a word with a minimum of $10.00 per insertion. Payment should accompany order. Allow 6 words if blind box number is used. Deadline: 10th of monh preceding date of issue.

SALES MANAGER WANTED

Fast-growing manufacturer of punched card supplies seeks national sales manager. IBM background desirable. Write Box F-1, MANAGEMENT and BUSINESS AUTOMATION, 600 West Jackson Blvd., Chicago 6, Ill.

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MBA'S Calendar Of Meetings

March 2-4 — Special Electronics Conference, American Management Association, Statler Hotel, New York.

March 3-5—Western Joint Computer Conference, Fairmont Hotel, San Francisco. Contact M. L. Lesser, IBM Research Laboratory, San Jose, Calif.

March 5-7—Southern Conference Controllers Institute of America, Hotel Roosevelt, New Orleans, La.

March 23-26—Office Management Association of Chicago Business Show, Conrad Hilton Hotel, Chicago. Contact William C. Dieden, chairman of the show, Chicago Federal Savings and Loan Association, 100 N. State St., Chicago.

April 13-15—Life Office Management Automation Forum, Chicago, Ill., Drake Hotel. Contact LOMA at 110 E. 42nd St., New York 17, N.Y.

April 19-21—Eastern Conference Controllers Institute of America, John Marshall Hotel, Richmond, Va.

April 21-24—12th Annual Southern California Business Show, Ambassador Hotel Convention Center, Los Angeles. Contact Publicity Chairman Edward P. Barrington, National Association of Accountants, 731 S. Spring St., Los Angeles.

June 15-20—First International Conference on Information Processing, Paris, France. Contact for U. S. committee, I. L. Auerbach, Auerbach Electronics Corp., 109 N. Essex, Narbeth, Pa.

June 24-26—National Machine Accounts Association, St. Louis, Mo., Chase Park Plaza. Contact M.A.A., Paris, Ill.

November 16-20—Fifth International Automation Congress and Exposition, New York Trade Show Building, New York City. Contact: Richard Rimbach, managing director, 845 Ridge Ave., Pittsburgh 12, Pa.

EDITORIAL

The Disaffected

In recent months a few self-styled authorities have made a surprising exodus from the computer bandwagon. Their departure, in a year when computer billings hit a $400 million high, might have gone unnoticed were it not for the fact that consultants are suddenly "viewing with alarm," where once, at the drop of a voucher, they were "pointing with pride."

If we were to accept the statements of the disaffected few, we would be forced to believe that America's business executives have been taken for the biggest electronic one-way ride in history. But the facts, at times an annoyance to some "experts," are quite to the contrary.

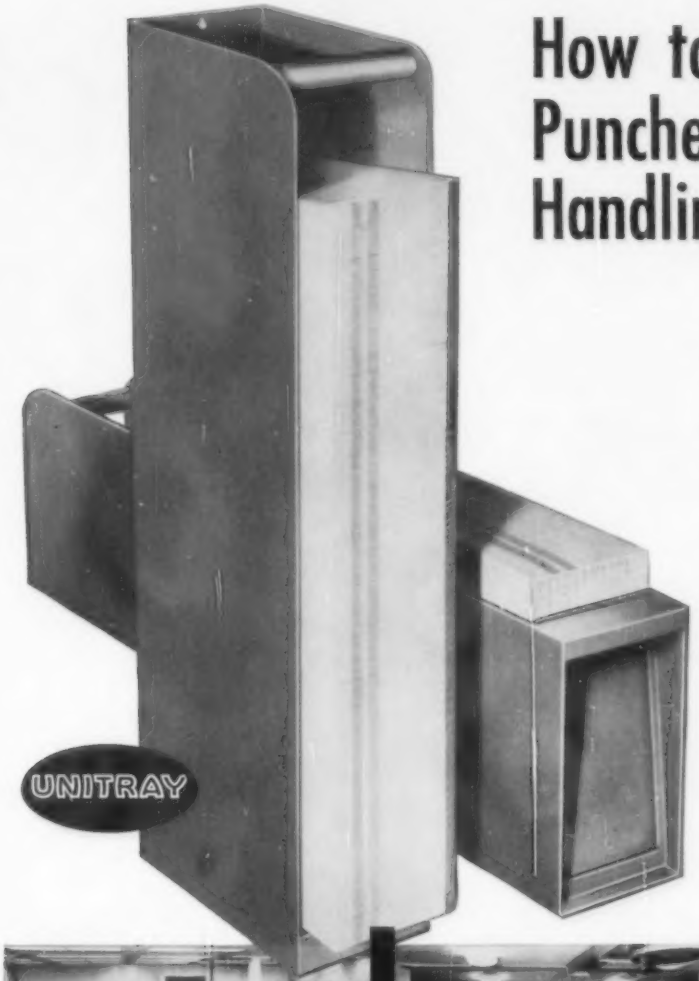
There has been little inclination on the part of management to abandon or retrench computer installations even in a period of recession and tight profit squeezes. More than 2,500 digital general purpose computers, large, medium and small-scale, were in operation at the close of 1958, and most of these installations could properly be termed successful. True, there have been a few cases of disenchantment, but one wonders if most of these computer disappointments could not be traced directly to the handiwork of those who today are preaching the gospel of "user beware."

No one questions that as Burroughs' vice president, Ken Tiffany, stated recently, "There has been overselling, over-expectation of fast results, and an underestimation of the task of putting computers to work." But this is a far cry from failure, particularly in the light of continued sales increases.

The computer status today is not unlike the early days of the punched card. There were those who said cards would never last—in fact, just recently one "authority" buried them again. These dire predictions have evidently escaped the attention of such industry leaders as Tom Watson, Jr., who is busily engaged with the construction of new card making facilities all over the country.

Certainly there have been punched card failures—many of them—but the system remains today, an indispensable tool to most types of business operations. Despite the sudden scepticism of our friends who have left the bandwagon, the computer, too, will have a long and productive life in the business world.

How to solve your Punched Card Handling Problems!



With punched card processing increasing in speed, faster card handling becomes more necessary to give you overall departmental saving. *Only* UNITRAY can do so many jobs around the department or wherever punched cards are being used. *Only* UNITRAY is able to offer you complete and simplified card handling, storage, transporting and filing – all in one lightweight, low cost, flexible tray. Card "juggling" is eliminated forever.

UNITRAY was designed to do a job. Its capacity – 3,000 cards – is large enough to be operational, yet small enough to be convenient. Its flexibility of application allows you to buy only what you need in your department – compression V-action or indexing.

Vertical use of tray saves space and increases speed of operation. Horizontal use of tray provides reference or storage also with space savings advantages.

Anywhere you can lay one punched card, UNITRAY will handle 3,000 in the space-saving vertical position. UNITRAY provides superior, large-size labeling – the full front of tray. Handling is easier too with large lip handle in front and rod handle at open back. UNITRAY works "full time" to help you get your job done.

This department is using UNITRAY sorting racks, trucks and storage cabinets. UNISTORALLS in the foreground store work-in process in UNITRAY and give added work surface.

A narrow room uses UNITRAY wall racks to separate work areas, stores thousands of cards in 10 inches of space. Reversing of UNITRAY protects stored cards. Note UNITRAYS being used at accounting machine and collator.

Again, wall space has been lined with wall racks to store thousands of cards in the smallest possible area.

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Left, Copyflo 24 continuous printer.

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